TEST CENTER REPORT: THE ULTIMATE HARD DISK BUYERS' GUIDE

PC WORLD

April 1993

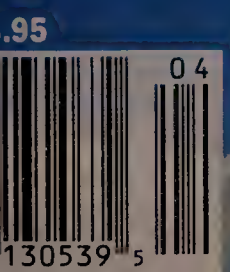
Bargain Software

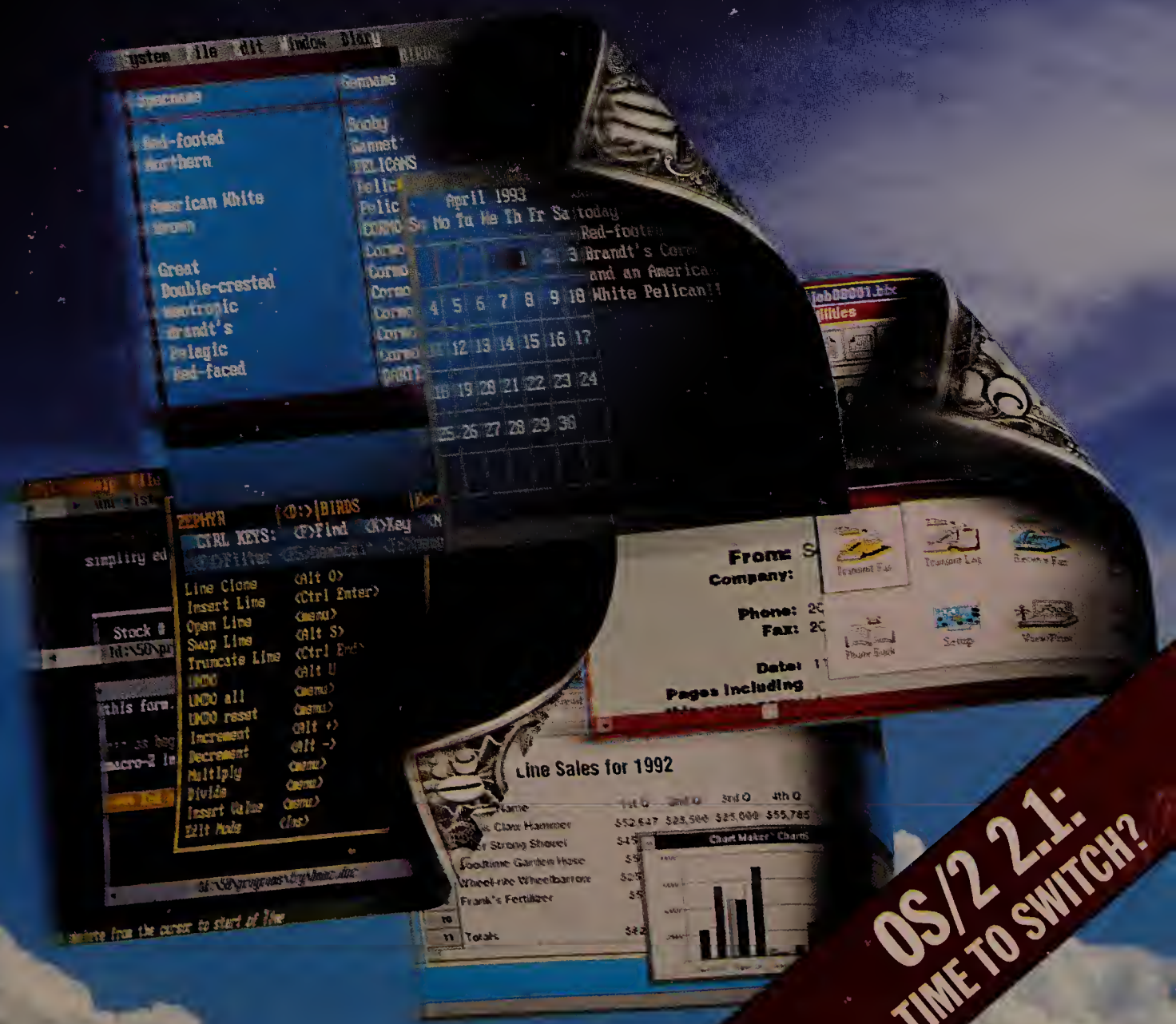
45 Top Programs For $50 or Less!

107 Fast Fax-Modems For $75 and Up

20 Windows Notebooks Starting At $1500

Local Bus: The Key to Faster PCs?





OS/2 2.1: TIME TO SWITCH?

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Systems

114 Windows Notebooks for $2000 or Less
The key to efficient, *Windows*-capable computing on the go is plenty of power, memory, disk capacity, and battery life. The cost? Far less today than six months ago. We test 20 affordable notebooks—all under 9 pounds and priced around $1800 on the street—that have what it takes to satisfy resource-hungry *Windows*.

143 Local Bus: The Key to Faster PCs?
Touted as this year's secret ingredient for high-performance computing, local bus opens a wider, faster pipeline between peripherals and the CPU. But are its speed benefits really significant? If so, which standard should you bank on?

Cover Story

Great Software Under $50

100 From fonts to personal finance programs, hundreds of high-quality software packages are available for $50 or less, if you know where to find them. Our two experienced bargain hunters do the legwork for you, scouting out 45 top *Windows* and DOS programs that'll boost your productivity without breaking your budget.

102 Communications
102 Data Management
103 Fonts
103 Grammar Checkers
103 Help and Training
104 Legal and Official Documents
104 Personal Finance
105 Personal Information Management
108 Publishing and Presentations
109 Spreadsheets
109 Text Editing
110 Utilities

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Top of the News

40 There's a New OS/2 You Must See
Due out this quarter, OS/2 2.1 promises improved *Windows* performance.

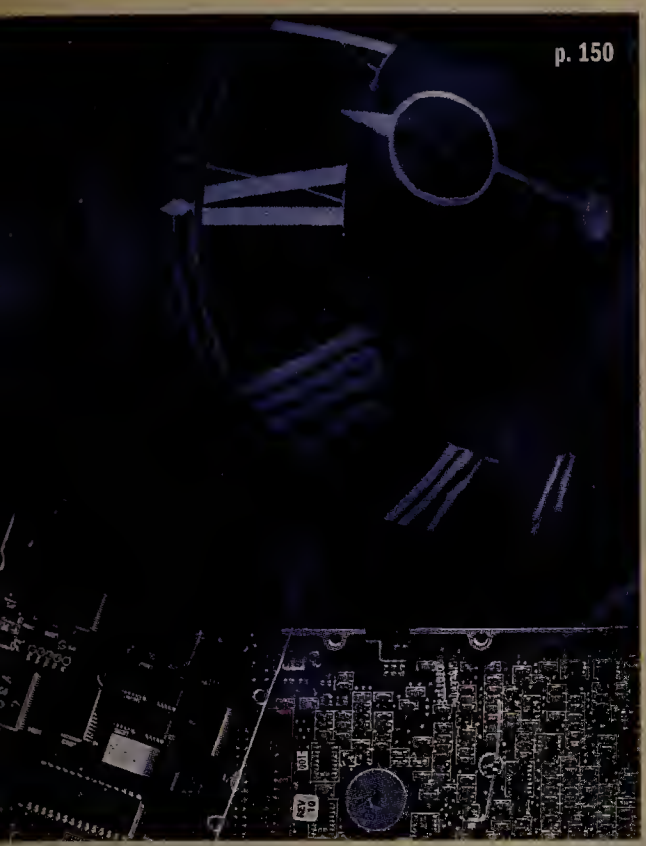
43 Maximizing High-Speed Modems
Getting top speed from a fast modem takes more than just plugging it in.

44 Pinnacle Delivers Room to Grow
Pinnacle's PMO-130 rewritable optical drive: fast, light, unlimited storage.

44 Laplink V: Drag and Drop on a LAN
Easy file transfer comes to networks.

48 Deals Abound in Software Price War
Buyers get a break as vendors duke it out.

54 Notes 3.0: Power and Grace
A giant step forward for work groups.



Hard Disks

150 Buyers' Guide: 200MB Hard Disks
If *Windows* and its applications are putting the squeeze on your disk space, a 200MB drive may be the most cost-effective solution. Use this comprehensive guide, complete with real-world testing, to choose a reliable, high-performance drive that'll meet your storage needs for years to come.

Communications

162 Faster, Cheaper Fax-Modems
Nothing beats the speed and convenience of sending faxes directly from your PC. Find the best board for the job with this guide to 107 fax-modems that sell for as little as $75.

Windows

175 Draw Programs for the Rest of Us
For adding simple drawings to business reports, high-end draw packages can be overkill. We review seven entry-level *Windows* draw programs designed to create graphics with a minimum of fuss.

New Products

63 NEC Image Series 486 PCs
63 PC Mouse 3D/6D
64 Brother HL-10PS laser printer
64 Sony CPD-1430, CPD-1730, GDM-2038 Multiscan monitors
66 Iomega Floptical drive
66 Dauphin 550 notebook
68 Leoscan 610, 1210 scanners
68 Adaptec SCSI Host Adapter, *Future Domain SCSIworks*
72 *QAPlus 4.7, CheckIt Pro* diagnostic software
72 PC-Kwik *WinMaster 1.5* utilities
73 *1-2-3* release 3.4
73 *XTree for Windows 1.5*
76 *Looking Glass HyperWrite 1.0*
76 *Fractal Design Painter 2.0*
78 *AutoCAD* release 12 for *Windows*
83 Fifth Generation Systems *Here & There*
83 *Web for Windows* peer-to-peer LAN
86 MultiModemLAN modem
86 Shiva NetModem/E for *Windows for Workgroups*
88 Quick Takes
95 **Marketplace**
Prices for popular PCs nationwide

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Here's How

188 Help Line
192 Spreadsheets
198 Word Processing
204 Windows
208 Data Management
212 Publishing & Presentations
218 Communications
219 Star-Dot-Star
223 Instant Reference Card
Norton Desktop for DOS

Departments

13 In This Issue
17 Letters
25 Consumer Watch
35 Real Problems, Real Solutions
257 Business Fixtures
261 Games: Break Time
266 Home Office

Resources

8 PC World Online
210 Coming Up
227 Fax Survey: Fax us your opinions for a chance to win a fax-modem.
228 PC World Catalog
238 Advertiser Index
239 Editorial Product Index
243 Mail-Order Shopping Guide

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—PC Computing, March 1993, BEST VALUE

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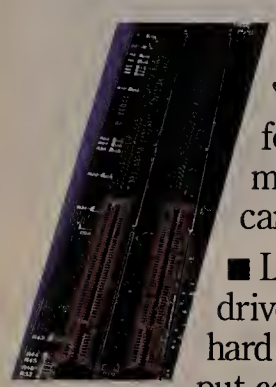

■ VESA-standard local bus video—the *fastest video performance* available anywhere. *PC Magazine* said the ZEOS 486DX2-66 "shattered our previous record...by nearly fourfold." Now the dazzling video performance that rated #1 with *PC Magazine* can be yours!

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—PC Magazine, January 26, 1993

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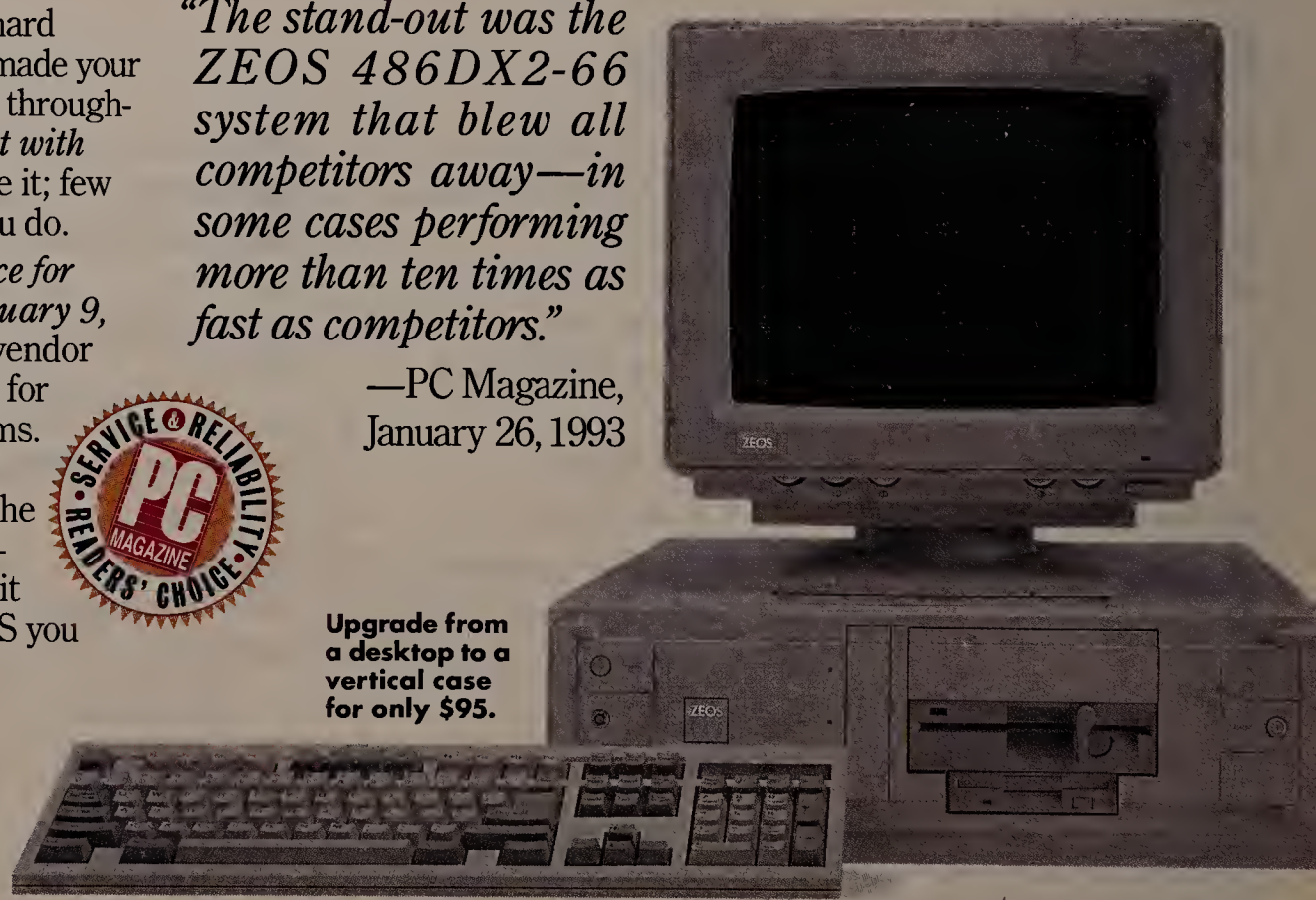

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—PC World, February 1993, BEST BUY

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$1795	2295	2595	2995	**486DX2-66**
■	■	■	■	Intel 486 CPU
■	■	■	■	ZIF upgrade socket
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32K	32K	128K	256K	Built-in hard drive cache
■	■	■	■	Local bus IDE hard drive interface
16	16	12	12	Seek time (ms)
■	■	■	■	1.2MB Teac floppy drive
	■	■	■	1.44MB Teac floppy drive
■				ZEOS 14" high-resolution mono VGA monitor
	■	■	■	ZEOS 14" high-resolution 1024x768 non-interlaced SVGA monitor
.28	.28	.28	.28	Monitor dot pitch (mm)
■	■	■	■	1MB high-speed VESA local bus card
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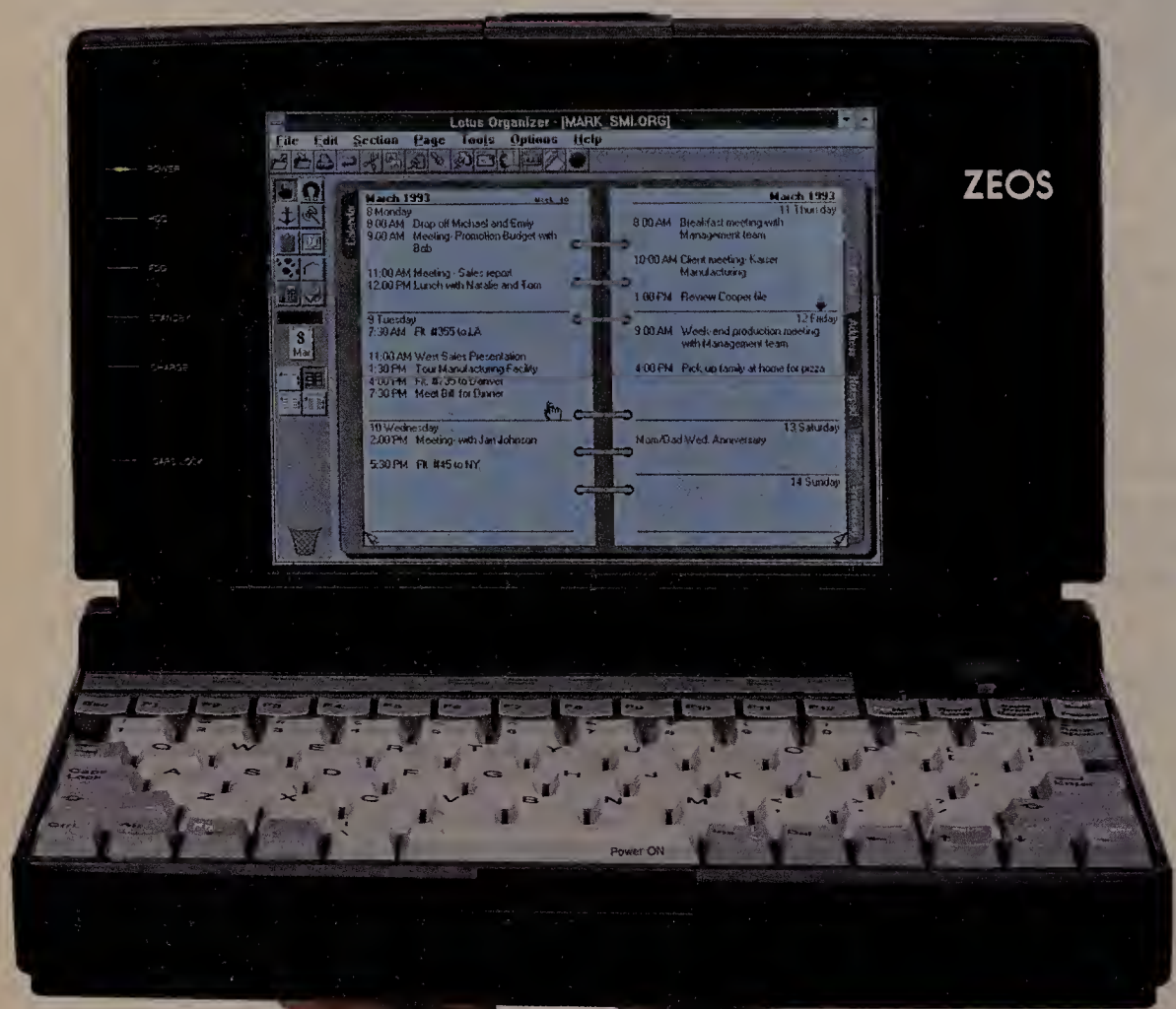

Smaller than a notebook, powerful as a desktop. At only 3.9 lbs., the new ZEOS Contenda keeps you light on your feet.

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	ZEOS Contenda	Gateway Handbook	Dell 320SLi
Processor	**Intel 386SL**	Chips & Tech. F8680	Intel 386SL
Processor Speed	**25MHz**	10MHz	20MHz
RAM	**2MB to 10MB**	1MB to 3MB	2MB to 10MB
Hard Drive	**80MB**	40MB	60MB
Screen	**VGA Backlit**	CGA Backlit	VGA Reflective
Runs Windows	**Yes**	No	Yes
Built-in Pointing Device	**Yes**	No	No
Footprint	**9.7" x 6.1"**	9.8" x 5.9"	11.0" x 7.8"
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CONTENDA PACKAGE I:
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- CPU: Intel 386SL
- Processor Speed: 25MHz
- RAM: 2MB expandable to 10MB
- Hard Drive: 80MB
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- Battery: NiMH; operating time up to 4 hours; a snap to remove
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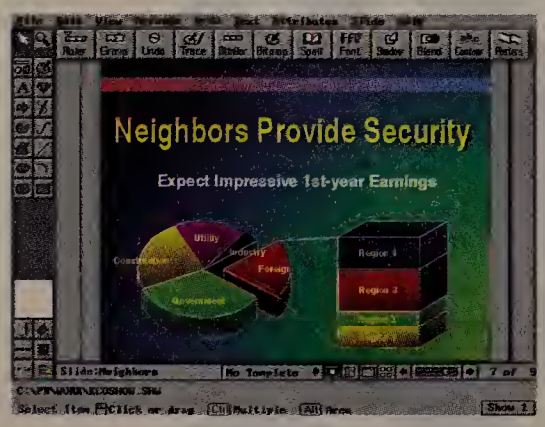

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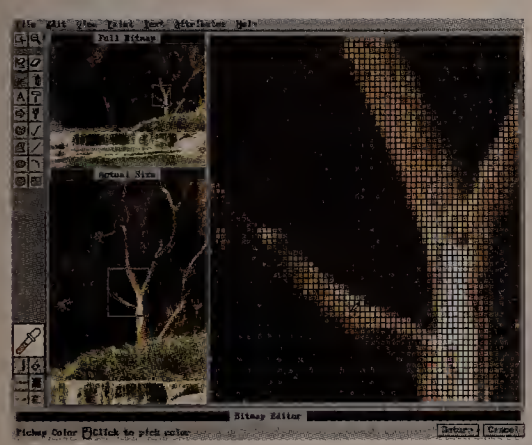

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It's the world's best-selling menuing software. And as soon as you install it you'll understand why.

Direct Access searches your disk, gathers your programs into logical groups and builds menu screens just like the one you see at the top of this page.

All by itself.

That's right. You just load it and forget it.

Whenever you want an application, all you have to do is hit one key.

Or, if you prefer, click one mouse.

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Neural Networks Shop for Software

Great software for $50? Suspend your disbelief. Hundreds of programs sell for little more than the price of a movie videotape or a music CD, and we're not just talking about shareware. There are just as many bargain gems from major commercial publishers. Low-prieed offerings range from databases to personal information managers to *Windows* enhancers to programs that create business cards, build presentations, and improve disk performance.

Why aren't more of these bargains better known? Because of the work involved in unearthing them. Our search for the best software bargains started with 4MB of product listings and then reached to electronic bulletin boards, PC user groups, and a wide selection of retailers. We fed these product listings and many of the programs through a pair of massively parallel neural networks trained for years to recognize good software. One of these neural networks was dedicated to identifying the best $50 *Windows* applications. Its name is Scott Dunn. The other concentrated on DOS programs. Its name is Steve Bass. Contributing Editors Scott and Steve came away from this experience with overloaded dendrites and fractured social lives. Thanks to them, you'll come away knowing about some inexpensive programs that make your PC more useful than ever.

Would you grab a couple of these bargain software packages, if only your hard drive had more free space? You should read "Buyers' Guide: 200MB Hard Disks." Manufacturers' specifications of seek times and transfer rates say nothing about how drives will affect your daily business computing. We tested 14 drives to see how they affected the performance of real application programs. Benefits were huge on some programs and trivial on others. Contributing Editor George Campbell summarizes the findings of the PC World Test Center and demystifies the other issues involved in buying a new hard disk either locally or direct.

Not long ago a $2000 notebook fully outfitted for *Windows* was unthinkable. This month we test 20 such notebooks and report on 6 others that arrived too late for review. The price of our Best Buy notebook from September 1992, the Dell Dimension NL25, has dropped almost $1000 in five months—yet 7 other *Windows* notebooks in this roundup sell for less than the Dell.

MICHELE CLEMENT

Two Views of Usability

This month's notebook review is another example of how the PC World Test Center is incorporating usability testing into our review process. Rather than use robots to press keys and test battery endurance, we asked real PC users to follow a script driving real applieations. As a result, we not only got more realistic measures of battery life, but we also gathered extensive feedback from ten users on keyboards, screens, and pointing devices. The observations about keyboards were illuminating. Preferences in keyboards varied enormously. So instead of telling you one editor's opinion of which keyboard felt best, we provide enough information to pick the keyboard that suits your preferences.

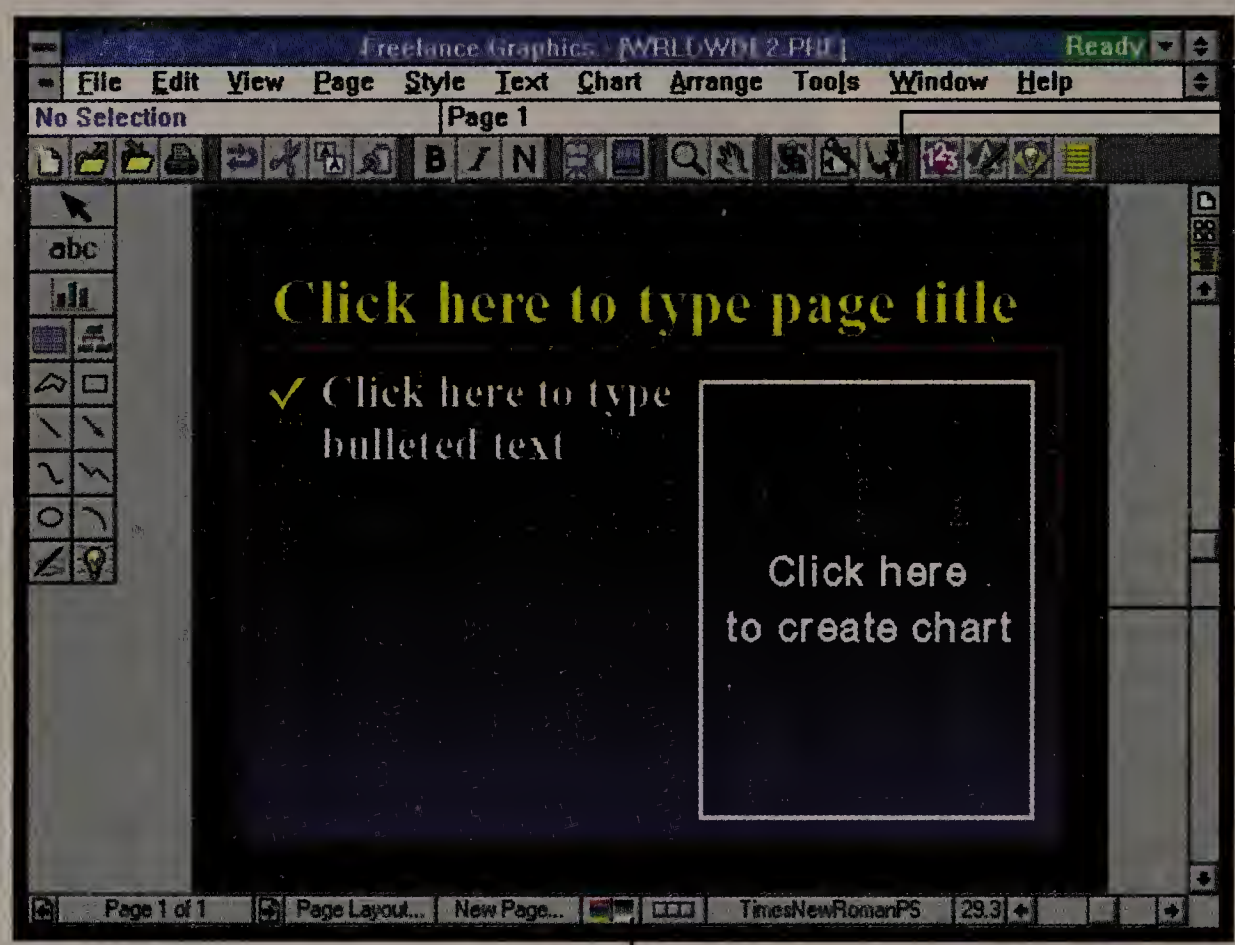
For his *Business Fixtures* column, Thom Foulks continually examines products to determine which should become fixtures in your business. Thom's viewpoint complements our large group product reviews, in which we give a host of products an intense, systematie, but necessarily time-limited workout to bring you current comparative ratings. Thom's longer-term product usage often enables him to make observations that escape the notice of a conscientious reviewer who tests a dozen products each month. For example, Thom's early annoyance with Delrina's *WinFax Pro 3.0* corroborated the findings of our February review of *Windows* fax programs, in which our panel of newcomers to fax software rated Delrina's program strong in features but weak in usability. But over time, Thom's annoyance gave way to enthusiastic endorsement of *WinFax Pro 3.0* as the fax program by which all others should be measured. Thom also reports his observations on Micrografx's *ABC FlowCharter 2.0*, MSI's Cachét optical disk drive, SWFTE's *Typecase II*, and Richmond Technologies & Software's *Maximizer for Windows*.

PC World
Editor in Chief
Phil Lemmons

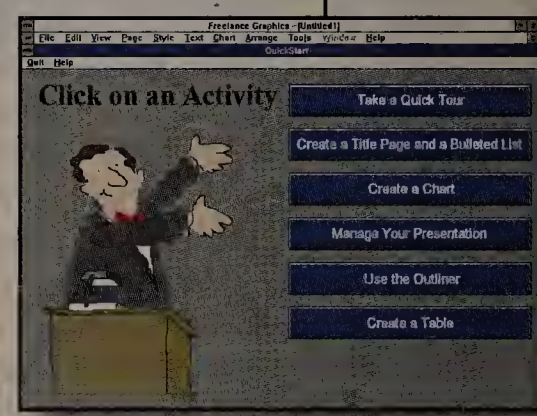
Phil Lemmons

Phil Lemmons, Editor in Chief

New Freelance Graphics 2
(Especially the decision t

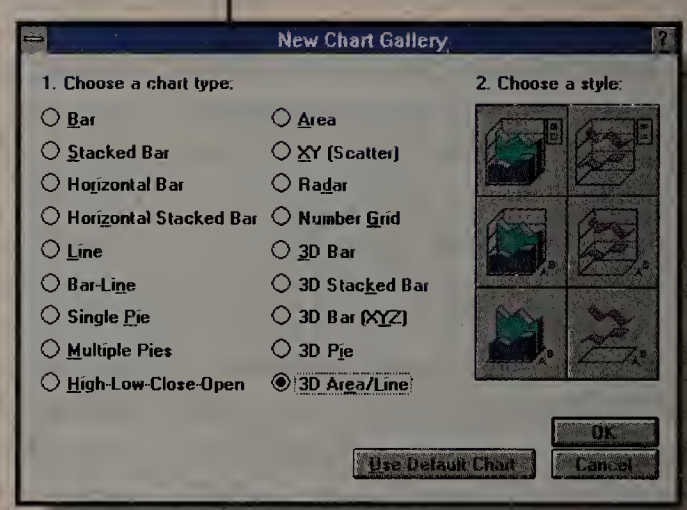


Single-click access to powerful presentation tools makes Freelance Graphics easy to use.



Just click to view the animated QuickStart tutorial. It walks you through your first presentation in under 30 minutes.

Just click to instantly see your presentation in color or B/W. It's automatically optimized for printing both.



Just click to browse through a gallery of 108 ready-to-go chart styles including new 3-D line, 3-D area and radar selections.

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"no one told me"

"i was stuck in traffic"

"what meeting?"

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In Search of Large Hard Drives, Investing in NT, Sorting Out CPUs

From Here's How to Hard Drives

Thank you for the December issue, the most informative issue of *PC World* I have yet received. I like the new no-frills, professional look of the magazine as well. Special kudos go to whoever made the decision to expand the "Here's How" section.

I do have one suggestion. I see lots of reviews of monitors, CPUs, and entire systems. However, I have yet to find a review of hard drives or caching controller upgrades.

David Heupel, Tallahassee, Florida

Editor's response: We review 200MB and larger hard drives in this issue's buyers' guide. And you can look forward to a comparison of caching hardware and software in the June issue.

What About that New Window?

The December issue's "Windows NT: A DOS for the '90s" was a very thought-provoking piece. I'm not a *Windows* fan, but Scott Spanbauer made me want to take NT for a test run. I wouldn't mind buying all the hardware to run the thing either, since it sounds like NT will solve some of my basic problems.

But Spanbauer says that NT's support for DOS will be limited. If I read the article correctly, only the major DOS applications will run under NT.

My company has invested thousands of dollars in a customized DOS database for our credit department. We've also invested big bucks in NetWare. Is all that investment lost with NT?

Frankly, I've been led to believe that OS/2 would be better for us since we wouldn't have to throw out what we already have. Am I wrong?

Bill Ramsey, via PC World Online

Editor's response: Whether your application will run under Windows NT really depends on how it interfaces with DOS. According to Microsoft, if the application avoids direct BIOS calls and doesn't bypass the operating system when accessing system hardware, it should run under NT. It's too soon to tell how Windows NT will actually perform and what its hardware requirements will be when released. OS/2 may work for you, depending on what hardware and software you currently use—users I've heard from are either ecstatic about OS/2 or infuriated by it. For now, MS-DOS is still the best DOS. —*Scott Spanbauer*

Cheaper to Toss the Computer?

Just a compliment for an excellent December issue. I especially appreciated "The Complete Guide to the New CPUs," particularly the information that Cyrix was considering coming out with an upgrade for 386SX computers. I'd like to see a more in-depth article on this subject and what Cyrix is planning. Many people bought 386SXs because they were good entry-level machines before the *Windows* power drain. It seems a shame that it's cheaper to throw the machine out than to upgrade it. But if a new chip costs only a couple hundred bucks, there's hope.

Danny Sullivan, Balboa, California

CPU Enlightenment

I just wanted to tell you that your December issue was one of the best that you've published. Especially well done was the article on current and future CPU chips and upgrade paths ("The Complete Guide to the New CPUs") for those of us with *ancient* 386s. Keep up the good work—we need a magazine with timely, useful information and a minimum of gee-whiz hype.

Sandy Rohrbacher, Lafayette, New Jersey

Taking the Heat

Your recently published criticisms of FastMicro ("Readers Rate Direct-Sale Vendors" in November, and "486SX-25s vs. 386DX-40s: The Upstart Fights Back" in December) took a lot of guts. My opinion of *PC World*'s editorial independence and integrity increased enormously after reading your comments. I read several other computer magazines and they almost never print anything negative about any of their advertisers. By the way, I purchased a FastMicro computer last August and experienced many of the problems you described.

J. Grothe, via PC World Online

Strange But True

Strange as it may seem—and contrary to the information supplied by Paul Litwin in his "Microsoft's Accessible Database" in December—Microsoft's relational database *Access 1.0* cannot import data from Microsoft's *FoxPro*.

Jonathan Cohen, Amsterdam

Editor's response: *Access* can read and write *dBASE* DBF files, which *FoxPro* uses, but it can't read or write Fox's proprietary indexes and memo fields. This is definitely a flaw in the program and an error on our part for not noting it.

Taking Tiger to Task

I called TigerSoftware after I saw your assurance in December's *Consumer Watch* that they would honor the price on CD ROMs offered in their advertisements in your November issue.

PETER ALSBERG

Contrary to what you indicated, Tiger still refused to sell the disks unless I purchased a player.

Dennis Dirks, East Northport, New York

Editor's response: Tiger told *Consumer Watch* that, because of the mistake in their ad, they would honor the price of the CD ROMs without insisting that consumers buy the player from them. However, due to Tiger's contract with their suppliers they were unable to honor this promise. Unfortunately Tiger didn't tell *Consumer Watch* about the problem until after press time.

Offended Cartographers

In December's "What's Next," Mike Hogan has done a disservice to the American Automobile Association and its cartography department. He implies that AAA maps provide inaccurate information. AAA road reporters, each of whom drive between 50,000 and 60,000 miles annually on North American roads, collect information on mileage, interchange signs and designs, exit numbers, rest areas, gas, food, lodging, and travel restrictions. Their current data is integrated into all appropriate cartographic products on an annual basis.

Furthermore, the comparison of hard copy to digital maps is mixing apples and oranges. Each product has a specific functional niche. Paper maps in and of themselves do not predict distance, travel time, and the fastest route. They serve as an inexpensive, multipurpose, geo-referential tool for human beings. An occasional traveler can hardly justify the expenditure of more than $100 on software, not to mention the cost of a portable computer, when a $3 map will do. That would be like hunting a duck with a cannon.

Stan Grzeda, Director of Cartography, Travel Publishing Department, American Automobile Association

Bugged by Bad Counsel

My eyes bugged out of my head when I saw your advice in the January *Help Line* on where to find a comprehensive listing of CD ROMs. For the same price of $199, you could get a subscription to the Nautilus multimedia information service (800/637-3472 or 614/766-3165) on CD ROM for the next year (12 issues) and still

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POWERTIP no.273

Accessing WordPerfect's Special Characters

In *WordPerfect 5.x*, the CHARACTR-.DOC file contains a tabular listing of special characters, their character map numbers, and a short label for each character. Press <F5> and enter the directory where your *WordPerfect* program files are stored. Highlight CHARACTR.DOC and press <Enter> to open the file. Press <F2> and enter the name of the character; for example, enter degree to find the line containing the information '6,36 ° Degree sign'. Return to your document, press <Ctrl>-V, and enter 6,36 to produce the degree sign.

Mary Ginder
Baltimore, Maryland

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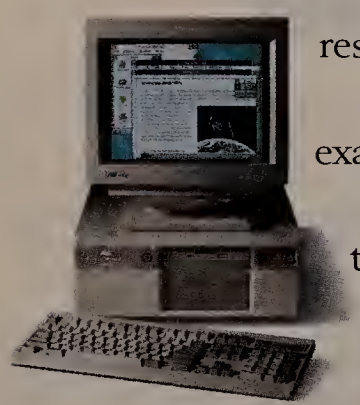

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have enough money left over to pick up one or two other CD ROM titles. The Nautilus CDs contain current listings—perhaps they are not entirely comprehensive—with each issue, as well as an assortment of demos, games, utilities, pictures, programs, and sound clips. At the end of a year, you will continue to get current listings with Nautilus, but the other directory will be a year out of date.

Evan Morris, Vancouver, Washington

Corrections and Clarifications

Our February review of 486 systems contained a pricing error on the Best Buy Acma 486DX2/50. Although the $2395 December price listed for the system with a 15-inch monitor was correct, the October price should have been listed as $2495. Contact Acma at 800/786-6888 to get a current price quote.

The same article gave the incorrect street price for the Best Buy AcerPower 486e DX2/50. The correct price is $2735.

We published the wrong street price for the Best Buy Packard Bell 486SX/25 reviewed in our December 1992 issue. The price should have been $1930.

In Tip #17 of the January article "75 Windows and DOS Speedup Tips," page 126, the batch file's second line should have read **IF EXIST C:\WINDOWS\%1\NUL GOTO MAIN** (note the *L* in 'NUL').

In the User Group Tip "Easy WordPerfect Dot" on page 212 of the January issue, the correct key sequence is **<Alt>-<F6>**.

The chart that accompanied "OS/2 Versus Windows NT" in February should have stated that neither OS/2 2.0 nor Windows NT can handle the *Windows* applications that require 386 enhanced mode.

Contrary to the January *New Products* preview, the Gateway 2000 4DX2-66V does *not* have a 238-pin upgrade socket; the Zeos Upgradable does. Gateway plans to add an upgrade socket in a future machine.

Mail your reactions, responses, and ideas to Letters, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Letters; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax). Include your name, city, state, and phone number. We reserve the right to edit letters.*

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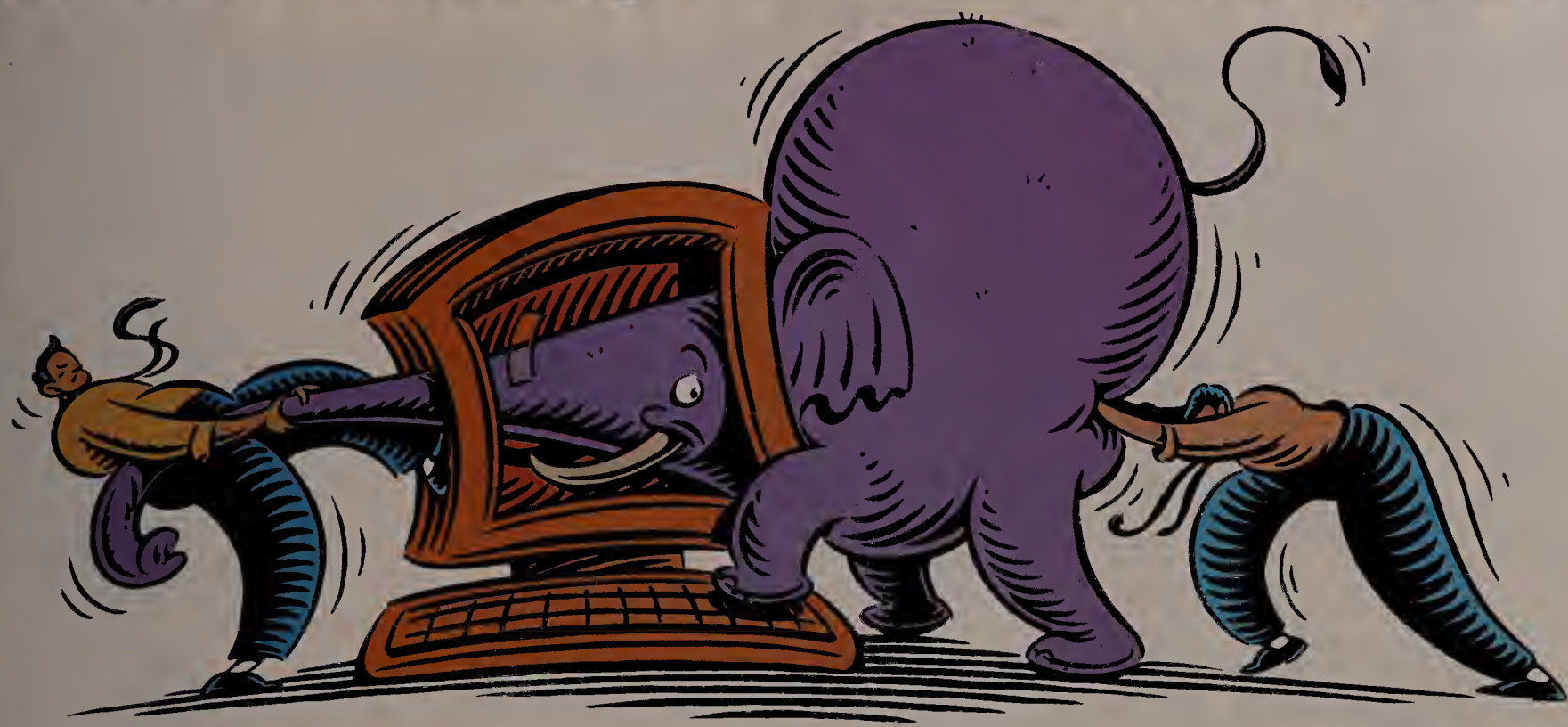
POWER TIP no. 274

Run a Microsoft Word Macro Automatically at Start-Up

You can direct *Word 4.0* or *5.0* to execute a macro automatically every time you load the program. Any macro named autoexec will execute upon start-up. For example, to set up a macro that automatically displays a list of files, start *Word*, and press <Shift>-<F3> to begin recording a macro. Press <Esc>tl<F1> to display a list of files in the current directory. Press <Shift>-<F3> again to end macro recording. At the 'Copy to' prompt, type autoexec, then press <Enter>. To save the macro in the current glossary file, press <Esc>tgs<Enter>.

George Campbell
Contributing Editor

There's An Easier Way To Get More Memory Into Your Computer



If you've been struggling to get the most out of your PC's memory, there's an easier way. It's called NETROOM – the award winning memory manager that uses the newest technologies to shatter memory barriers, giving you more memory and a faster system.

CRASH-PROOF

With *"Customize"*, NETROOM's crash-proof installation utility, you can configure all of NETROOM's features automatically – just type one command and you're done! Even if you turn off your system in the middle, when you turn it back on *"Customize"* will pick up where it left off. Of course, you can always customize *"Customize"* if you like.

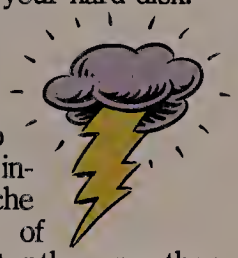
But there's more to memory management than just easy installation. NETROOM includes our revolutionary *"Cloaking"* technology – a technique that allows DOS drivers and TSRs to run in extended memory as if they were running under Microsoft Windows™. *Even if you never run Windows!* If you do use Windows, you'll find our cloaked utilities fully Windows-compatible.

NETROOM provides a cloaked system BIOS for all compatible systems including ISA, EISA, MCA and Laptops. NETROOM's cloaked BIOS is designed to run in the "protected mode" of your 386/486 family processor. This makes it safer to use. The cloaked BIOS also takes full advantage of the 32-bit power of your computer so it runs faster. And it doesn't occupy any DOS memory, so you save up to 96K. Think of it as a *free* BIOS upgrade that saves memory and makes your system run faster.

YOUR "FLU" SHOT IS BUILT IN

In NETROOM, virus protection is integral to the cloaked BIOS. It detects when a virus or errant program tries to get at the most vital parts of your hard disk and prevents the damage before it begins. Our cloaked BIOS even stops attempts to destroy your data by reformatting your hard disk.

LIGHTNING SPEED



To really soup - up your system, NETROOM includes a cloaked Disk Cache which occupies only 5K of DOS memory, but runs faster than any other cache. That's because our cloaking technology unleashes the 32-bit power of your system. And, NETROOM provides a cloaked text-mode screen accelerator that makes your screen run up to 20 times faster!

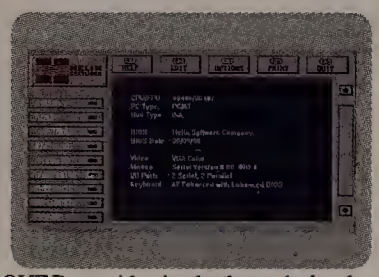
SOME PRETTY SHARP TOOLS

NETROOM is packed with other utilities as well. A cloaked graphical Screen Saver protects your screen from burn-in. A cloaked RAM disk lets you set up the world's largest RAM drive – up to 256Mb. And, cloaked DPMI support provides compatibility with the latest applications.

Colorful screen saver features exciting graphics

SYSTEM REQUIREMENTS: Netroom operates with any 386 or 486 system with at least 1Mb of RAM. Limited support for 286/Neat systems is provided but does not include "Cloaking". For Windows support Netroom requires Windows 3.1 or later (WFW is supported). Microsoft Windows is a trademark of Microsoft Corp.

We topped it all off with our enhanced DISCOVER™ system utility which now sports a snazzy and more easy-to-use graphical interface.



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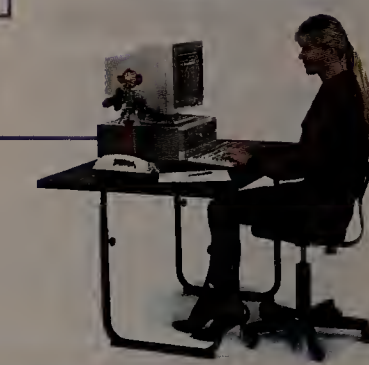

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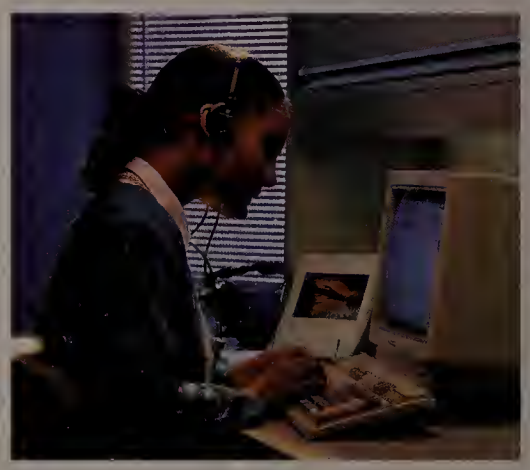

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The Hidden Costs of PC Purchases...and More

Consumer Watch routinely receives letters from mail-order shoppers who were charged restocking and/or shipping fees for incorrect or damaged orders that they later returned for a refund. Here's a sampling of some recent letters, along with some guidelines to follow so you can avoid similar charges.

Return to Sender

I purchased a 486 computer with an SVGA monitor from Vektron International, a mail-order firm in Grand Prairie, Texas. The system came with a 14-day money-back guarantee. I paid United Parcel Service $308.92 (Canadian) in brokerage fees and customs duties for the computer, and within hours I realized it was defective.

I contacted Vektron for assistance, and the company issued an RMA [return merchandise authorization] number so I could ship the system back (for $62). I received the computer replacement (paying another $38.58 in brokerage fees) and found there was another problem with the machine. I informed Vektron of the problem and asked for another RMA number. When they were late in providing this, I told them I wanted to return the whole system as part of their 14-day money-back offer.

I received an RMA number and shipped the whole unit back (for another $81.06). Several weeks later I discovered that Vektron issued a refund to my credit card and deducted a 20 percent restocking fee and an additional 5 percent for shipping and handling.

My total for the transaction was $1136.92, and I don't have anything to show for it.

Thomas T. Corat, Ottawa, Canada

In February 1992 I ordered a $1000 scanner from Peach Computer Systems of Norcross, Georgia. When it arrived, I discovered it was defective. I was advised by the manufacturer to return the scanner to the dealer for replacement.

I contacted Peach Computer Systems and received an RMA number. I asked when the new scanner would be shipped and explained that I had a project to complete that required the scanner. I was told the new scanner would be shipped as soon as the defective one was returned. I later found out the unit had been back ordered, so I decided to cancel the order and request a refund. I then ordered the scanner from someone else.

When I received my credit card statement, I found that Peach Computer had deducted $227.05 from my refund as a restocking fee. I called Peach Computer to dispute the fee since the scanner had been defective from the start, but the company said it always applies restocking fees and shipping and handling charged on returned items.

Keith Wrislet, President, KBW Typesetting and Graphic Presentations, Red Creek, New York

Editor's note: We attempted to contact both Vektron International and Peach Computer Systems on behalf of Corat and Wrislet. Phone lines for Peach Computer Systems had been disconnected, however, and we were unable to obtain any additional information about the company or its policies.

We did, however, receive a response from Vektron International's sales manager Eric P. Robb, who said, "I sympathized with Mr. Corat's frustrations, but I feel that Vektron has lived up to its obligations with this customer." According to Robb, the chances of something being damaged in shipment are "much higher" for Canadian customers because of the increased distances involved. The charges deducted from Mr. Corat's refund, according to Robb, were for shipping and handling, and a 20 percent restocking fee for returning a system more than 30 days old. "I believe these to be quite standard in the industry. They are not meant to defraud customers."

Certainly Vektron is not alone in levying a restocking fee on returned merchandise or in requiring customers to pay shipping charges. But as both readers' letters indicate, you can easily wind up spending a fairly hefty sum of money on such charges without any product to show for it.

While restocking fees and shipping charges are reasonable when a customer returns an item simply because it does not meet his or her needs, such charges are not appropriate when the returned item is defective, incomplete, or not what the customer ordered.

PC World Consumer Watch editor Roberta Furger

By Roberta Furger

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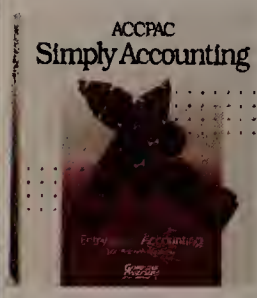

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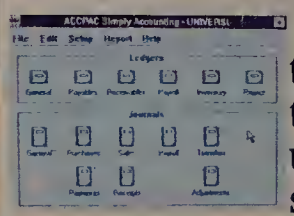

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Circle 29 on reader service card

Many companies, if prodded, will return shipping or restocking fees for defective items. Not all are so inclined however, so ask about a firm's policy *before* you place your order. Then get the information in writing so you have it to refer to later should the need arise.

Gateway 2000: An Uneven Service Record

Gateway 2000 has grown more rapidly over the past year than virtually any other mail-order PC company. The stea ly flow of *Consumer Watch* letters about the company attests to its increasing dominance in the market and to some of the difficulties the company has had in keeping up with its growing customer base.

Not all letters are negative, however. In addition to the letters of complaint and requests for assistance from Gateway customers, we also regularly receive letters praising its service.

First, the Good News...

I wish to let you know of the good service I received recently from Gateway 2000. I was having a problem with the internal clock in my home PC and called Gateway the next day from work. The technician I spoke with agreed to call me back when I got home in the evening and work with me to identify the problem. He talked me through the procedure, which took a couple of hours. He was very patient throughout, providing assistance without making me feel like an idiot.
Kim Kramer, Salt Lake City

...Now the Bad News

I recently tried to call Gateway 2000, and despite several attempts, I was unable to get through to a sales representative or get one to return my calls. They may be good, but they aren't that good.
Pete Smith, Jacksonville, Florida

This is what happens when you call Gateway for support: You dial the 800 number, and the phone is answered by a computer that tells you how important you are. You're then placed on hold for about 5 minutes, and an operator comes on the line and asks how to direct your call. When he or she transfers you to technical support, your call is placed in the queue, where you remain on hold for 15 minutes before you are referred back to the operator, who tells you that all the lines are still busy and offers to take a message and have a technician call you back. Well, you figure, it's the only way you are going to get through to these people, so you leave all the information. But guess what? They never call back. It took a week before I heard anything from Gateway, and the only reason I did was because I called again.

The only way around this mess is to get very mad on the phone and ask to be transferred to the CEO's office. People then start to get things moving for you. You should by no means say "technical support" when the operator asks where to transfer your call. If you do, you'll have a long wait.
Donald Poole, Waldorf, Maryland

Editor's note: *Consumer Watch* contacted Gateway 2000 about the type of service problems mentioned in Smith's and Poole's letters. We received the following response:

"Unfortunately, the response time in returning calls has fallen below our normal company and customer expectations. We are aware of the problem, however, and we are working daily to improve our response times.

"Ted Waitt, president of Gateway 2000, recently solicited customer suggestions through our quarterly newsletter, *The Gateway Monitor.* He will personally be reading all of the responses (though he cannot respond to each concern personally). All of the information received will be compiled into a database for analysis. The result will be a report card for the company that includes the top 10 or 15 problems customers wrote about, along with various suggested solutions. We will then involve employees from all levels in the company to decide how to make improvements.

"I would like to assure you that the situation will improve in 1993."
Cathy True, Assistant to the President

Kudos for Pacific Data Products

A few years ago I purchased a PostScript emulation cartridge from Pacific Data Products. The cartridge worked well, but I

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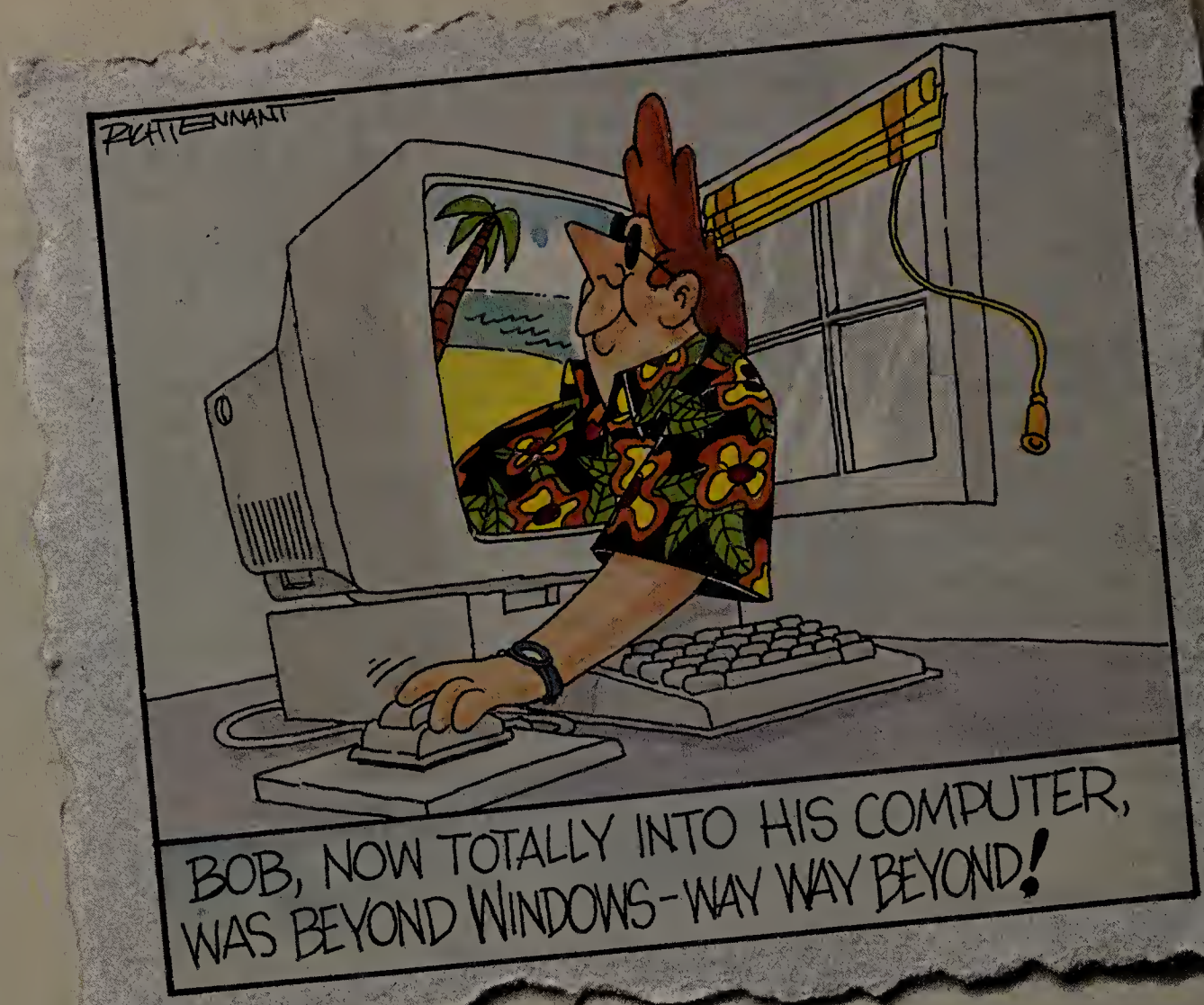

Introducing XTree® for Windows™ 1.5—way beyond Windows.

Microsoft® Windows™ 3.1 is a great environment. But serious users need a utility that goes beyond the two biggest panes in Windows – the File Manager and the Program Manager. *PC/Computing* called XTree for Windows "the most powerful File Manager replacement." Now, with version 1.5, it's the best replacement for the Program Manager, too!

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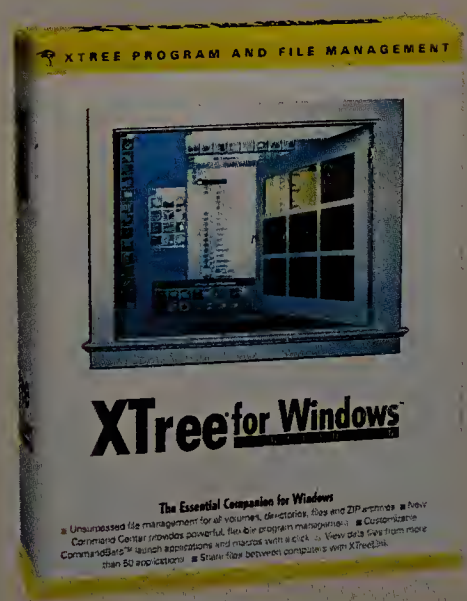

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As if that isn't enough, you also get XTreeLink, a utility that makes transferring files from computer to computer a cinch. With XTree for Windows, it's as easy as point and click!

As *Windows Magazine* said, "Usually, multi-function packages have to compromise somewhere. XTree didn't."

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Circle 237 on reader service card

did encounter some fairly unusual PostScript jobs that it would not interpret correctly. No problem, though. Pacific Data sent me an updated cartridge that solved the problem. I have since encountered a couple of other PostScript interpretation problems, and once again Pacific Data replaced my cartridge with a newer model that solved the problem. Most recently, the company even went so far as to send me a Federal Express shipping label to expedite shipping items to the company.

That's good customer service. It will make it easy for me to choose products from Pacific Data in the future.

David Johnson, Cary, North Carolina

BUG WATCH

Access 1.0

Users report and Microsoft confirms an incompatibility between *Access 1.0*, the recently released *Windows* database, and drivers for the ATI Graphics Ultra video card. The conflict can lead to General Protection Faults or improper text alignment on screen. Microsoft and ATI are working on a solution. Until one is available, Microsoft recommends using the 8514 video drivers included with *Windows 3.1*, rather than ATI's drivers. Microsoft has posted information about this and other *Access* problems on its BBS and CompuServe forum (GO MSACCESS) in the ACCBUG.TXT file. Workarounds are attached in most cases.
Microsoft
206/635-7060, 206/936-6735 (BBS)

ViruCide Plus 3.0

Users report that *ViruCide Plus 3.0* will erroneously indicate infection while scanning the Microsoft *C/C++ 7.0* compiler. Parsons Technology is aware of the bug, which specifically reacts to compiler file C23216.EXE, and has corrected the problem in release 3.0a of the product. Registered *ViruCide Plus 3.0* owners who also use *C/C++ 7.0* can call Parsons for a free upgrade.
Parsons Technology
800/223-6925

—Richard Melville

***Richard Melville is an editorial intern for* PC World.**

Have you run into a hardware bug or a software incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest.

Bundled Software Doesn't Qualify

After reading in the December 1992 issue of *PC World* that Macromedia would upgrade users of *Action* version 1.0 to release 2.0 at no additional charge, I called the company to request my upgrade. I was told, however, that since my copy of version 1.0 came bundled with my CD ROM drive, I did not qualify for the free upgrade. Instead, I would have to pay $79.

I do not think this policy is fair, since the price I paid for the CD ROM drive covered all hardware and software, including Macromedia's *Action 1.0*.

Ronald Morgan, Santa Clarita, California

Editor's note: According to John Colligan, president and CEO of Macromedia, the upgrade offer applied only to customers who purchased the retail version of *Action 1.0* (for $495 list) after May 1, 1992. It did not, however, cover users who received *Action* as part of a bundling arrangement with a hardware manufacturer.

Missing in Action

I recently ordered a system from Gecco Computers of Tempe, Arizona, which was to be paid for within 30 days of receipt. After three weeks, the system finally arrived with the wrong hard drive, wrong case, and a defective monitor. Back went everything to Gecco to be fixed. Over the next few weeks I called several times to check on the status of the system and was repeatedly told "it's being shipped today."

When I didn't receive the computer I

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Circle 122 on reader service card

called again, and Gecco's phone lines had been disconnected, so I surmised they had gone belly-up. A phone call to the Better Business Bureau confirmed this suspicion.

Here is my dilemma: Gecco finally sent me the system back, and apparently after they had shut down. Why would they? It's not paid for, and it seems unlikely that the company intends to honor its appealing two-year parts and labor warranty or the promised on-site service (both of which can be obtained only by calling Gecco's now disconnected phone lines).

I can't reach them by phone, and no one is responding to my faxes.

Ron Susser, Los Angeles

Editor's note: It's likely that Susser's experience was the result of some of the confusion surrounding Gecco's last few weeks in business. The Arizona-based mail-order PC manufacturer, which had been in business since 1987, shut down its operation late last year after running into severe cash-flow problems, explains Gecco vice president Eldon Thomas.

According to Thomas, the firm suffered a sharp decrease in sales during the first weeks of December (shortly after Compaq and other major players slashed their prices) and, being "cash strapped," did not have the funds to continue in business. Thomas says that all but 20 to 25 orders were filled and that company principals are working with creditors in an attempt to resolve financial obligations without having to declare bankruptcy.

Unfortunately, owners of Gecco systems are not so fortunate. The company does not have any plans to continue its warranty coverage, and although the firm did offer on-site repairs through Idea Servcom, Thomas says that this service will not be available any longer.

Gecco is not the only PC company to stumble or fall in battle, however. For example, Cumulus, a PC mail-order firm based in Ohio, was placed in receivership at the end of last year, and Everex, a high-performance PC manufacturer in Fremont, California, recently filed Chapter 11.

Given the turbulent times and the likelihood of additional shakeout in the next few months, we offer a reprise of our *Consumer Watch* tips for PC buyers. Although some of the suggestions require effort on your part, the time that you spend researching a purchase may mean the difference between getting the product you order and being left empty-handed.

- Know who you're buying from. Look for companies with a proven track record that have demonstrated some longevity in the market. Call the company's local Better Business Bureau to see if complaints have been filed against it. Check system reviews for evaluations of both performance and service and support.
- Don't pay cash. Use a credit card or pay COD. You'll have little or no recourse if you pay by check, but stand a good chance of getting your money back if you charge the purchase and never receive your order.
- Evaluate the companies' return and service policies. Buy only from those firms that have 30-day money-back guarantees and that offer comprehensive service and support, such as 24-hour technical support and on-site repair service.
- Document everything. Request written confirmation about pricing, warranty coverage, and return policy *before* you place your order. Keep a record of all your phone conversations, including the name and title of the salesperson who takes your order.
- Verify availability and ship dates. Companies that can't ship an order by the promised date are required to notify you of the delay. If you don't receive an order on time and haven't heard from the company, contact your credit card company and let them know of the delay. If your credit card has already been debited, cancel the order and notify your credit card company.

Research assistance was provided by PC World *assistant editors Michael Desmond and Christina Wood.*

Think you've gotten a raw deal—or a great one? Mail the details to Consumer Watch, PC World, *501 Second St. #600 San Francisco, CA 94107; or send them electronically to PC World Online, Consumer Watch; MCI Mail, PC World Editorial; CompuServe, 74055,412; or 415/442-1891 (fax). We'll investigate complaints and publish letters with broadest interest.*

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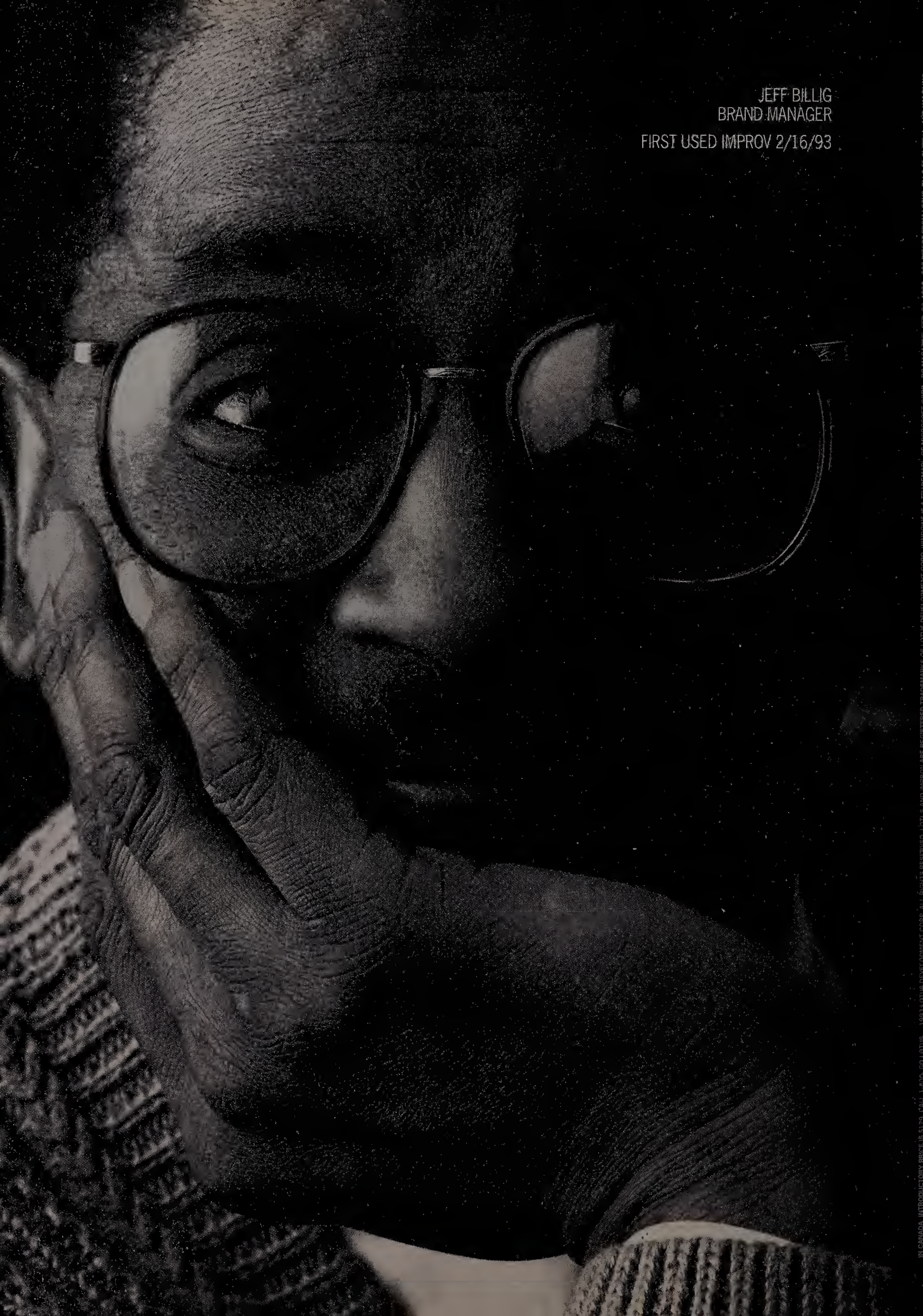
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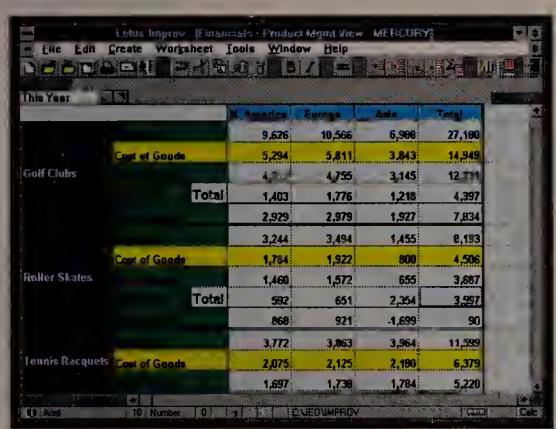
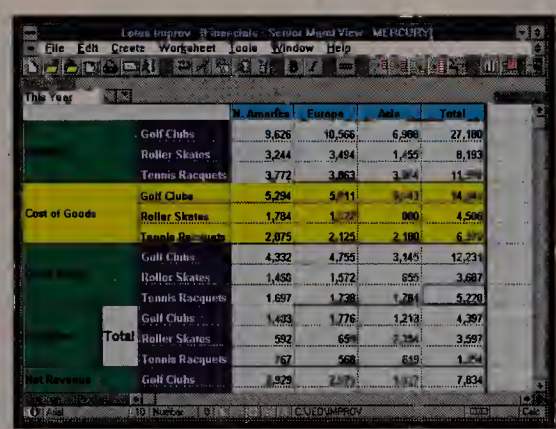


DYNAMIC VIEWS IN ACTION. VIEW 1 IS A SPREADSHEET BY PRODUCT (FOR BRAND MANAGER).



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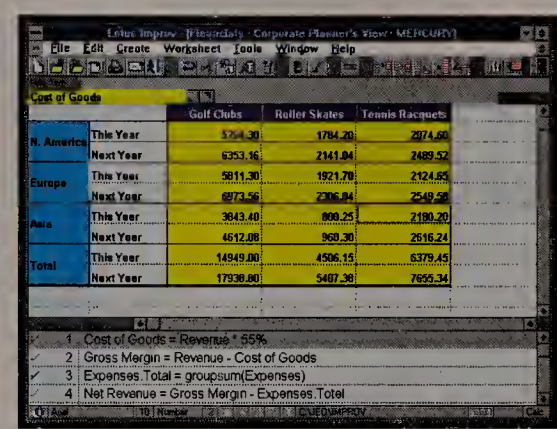

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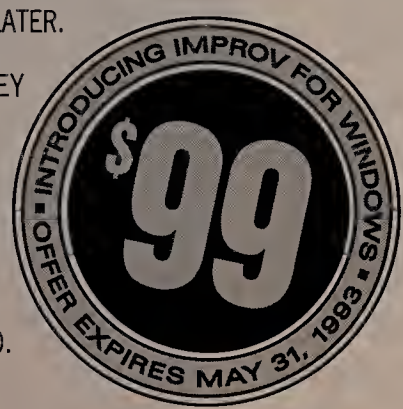

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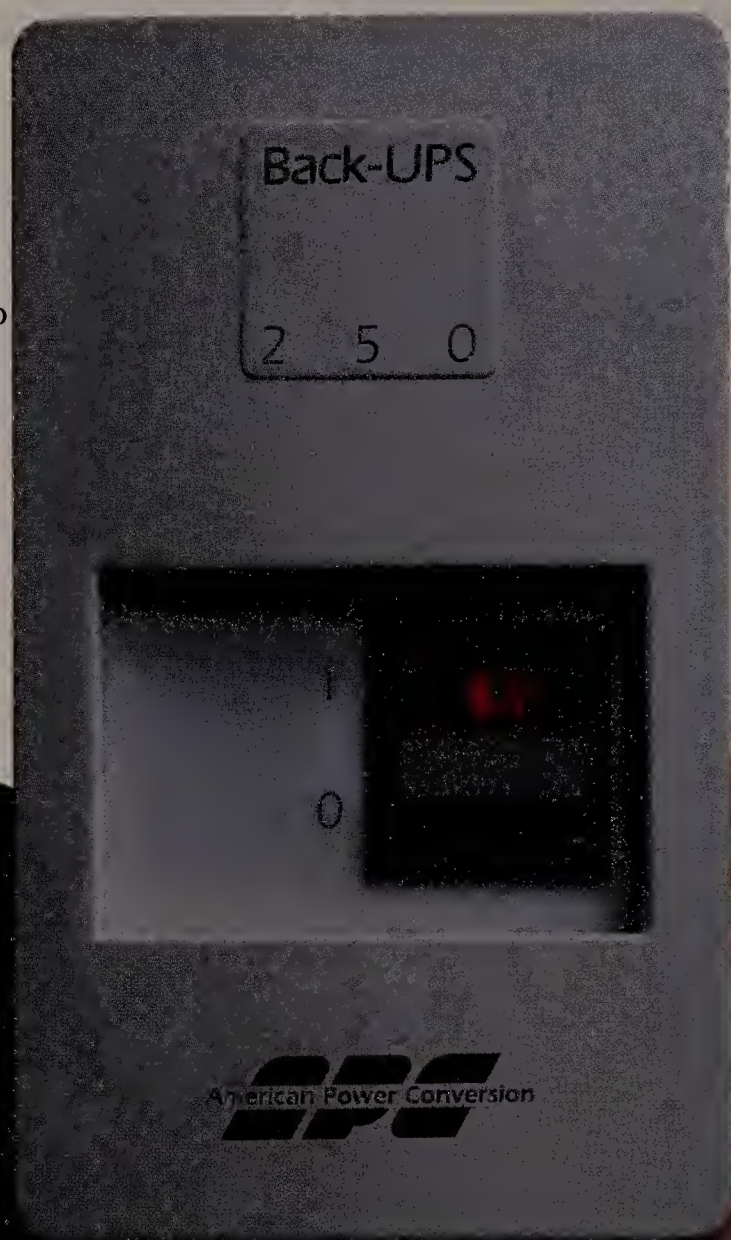

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LAN TIMES READERS CHOICE 1992

Computer Reseller News Editors' Choice

1991, 1990

Model	Application	List	New List
Back-UPS 250	LAN nodes, 386SX, 286, internet hardware, POS	~~$169~~	$139
Back-UPS 400	Desktop 386, 486 systems, 286 servers	~~$249~~	$229
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Circle 45 on reader service card

Tricks for Painless Scheduling

This month our mission to bring you tales from the front lines of computing takes us to Roth Aymond, director of information systems for the Louisiana Legislative Auditor. Aymond oversees the computing needs of some 200 in-house and field staff who monitor the state's financial heartbeat. His experience includes 12 years working with IBM mainframes and PCs. Because Aymond is a government auditor, he did not accept payment for this article. —*Ed.*

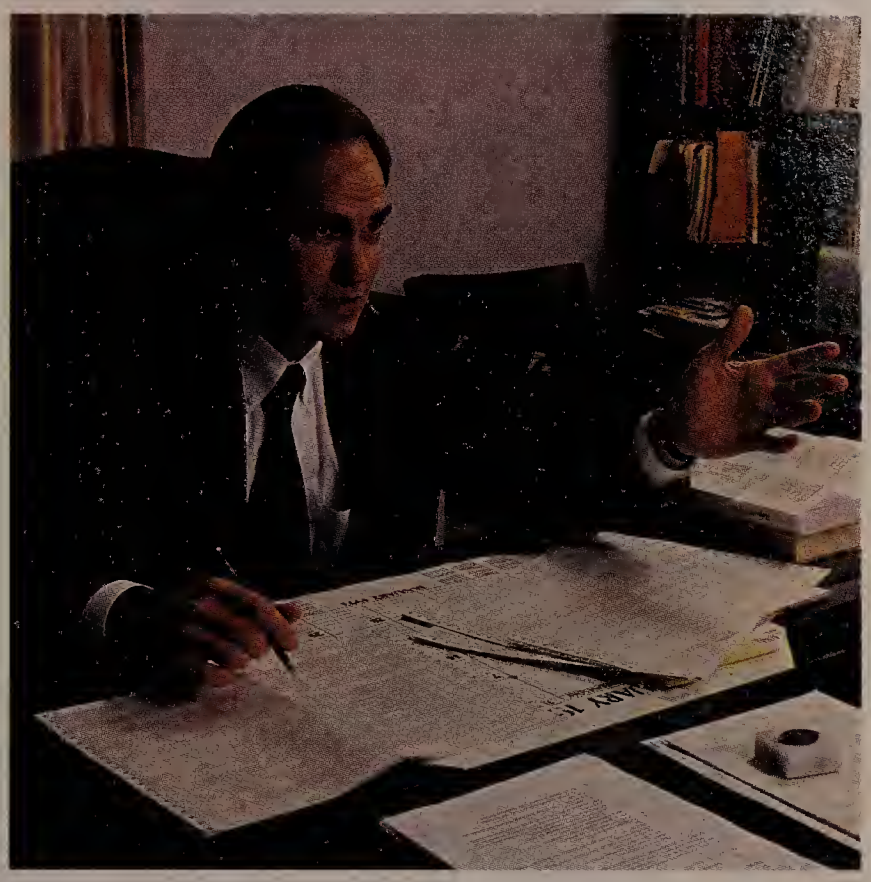
A Thorn In My Side

Scheduling software is supposed to make the common task of setting up meetings more efficient, but it doesn't always work that way. In my office, we took a few detours before finding the right package and establishing the necessary rules to make group scheduling work for us.

Here's how it happened: Two years ago, when I became director of information systems, our office was making the transition from a Wang minicomputer with terminals to a collection of PCs connected to a Novell network. Since we were losing the *Wang Office* scheduling system, which was very competent, my predecessor chose a new program with group scheduling capabilities: Polaris's *PackRat*.

But we had big problems right from the start: *PackRat* was slow, too complex for most of the staff, and we couldn't put more than 70 users on it. This last restriction was a particular problem because we have 90 users in our home office in Baton Rouge, working off of three servers, and a wide area network that connects two field offices. We also have almost 100 field employees who need to be tracked. Polaris released a *PackRat* upgrade that promised to be more to our liking, but the company wanted to charge $99 per workstation, and we felt we shouldn't have to pay more for what didn't work correctly to begin with. That's when I decided to make a switch.

I'm skeptical when it comes to software. I've seen too many demos where the program runs perfectly only because it's on a stand-alone 486. Try it on your network, and it runs like a dog. So I've established a few policies I follow before making a big purchase. If the software costs $150 or less, I buy a single copy and beat up on it for a month. If it costs more than $150, I ask the vendor to give me a free one-month trial. If the company won't, I don't bother with the product. In evaluating Campbell Services' *OnTime for Networks,* I called several companies that had used it to make sure they were satisfied, and when Campbell offered a free evaluation copy for a ten-user network version, I decided to try it.



I was looking for a package that would be easy to learn and would schedule our diverse users efficiently. Along with the capability to check people's schedules and report back automatically, our ideal software choice would update the availability of a room or equipment and would be accessible to remote users.

Access on the Road

We found that *OnTime* met our requirements, although for employees who work outside the office, the scheduling could be better. People in our two branch offices can update their schedules via the wide area network and be scheduled for meetings as though they worked in the Baton Rouge office. For our field employees, we have set up toll-free telephone lines that allow them to use Norton-Lambert's *Close-up*, a remote access package, to update their *OnTime* calendars.

Roth Aymond, director of information systems for the Louisiana Legislative Auditor

But updating data that way is proving to be painfully slow. We are waiting for a new "reconciliation" feature that will allow remote *OnTime* users to keep current copies of their calendars while they travel, and then complete two-way updates when they dial into the network. It would also be advantageous if the package worked seamlessly with *cc:Mail*, our E-mail system. That way people could RSVP for a meeting via E-mail and their calendars would then be updated automatically.

We quickly discovered that if you want scheduling to work, you have to require employees to keep their calendars up-to-date. It's also critical to decide which employee gets clearance to update the schedule for a room or equipment. For example, anyone can sign up to use our page scanner when it's free, but with conference rooms, accidental conflicts would be unaccept-

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able. We avoid that by putting one person in charge of making changes to the conference room calendar.

The downside is that it takes a while for everyone on the network to put away their Day-Timers and get used to scheduling on their PCs. Still, it's much better than handling scheduling the old-fashioned way. We've paid about $10,000 to license 200 users, but the convenience in managing our roving employees is worth it.

If you use PCs to manage people and other resources in a business environment, we want to hear from you. Send your article idea—including a brief outline of your company, job, problem, and solution as well as your name, address, and phone number—to Real Problems, Real Solutions, PC World, *501 Second St. #600, San Francisco, CA 94107; or send it electronically to PC World Online, Real Problems, Real Solutions; or 415/442-1891 (fax); or call us at 415/978-3224. We pay $300 per published column. Sorry, we cannot acknowledge unpublished materials.*

POWERTIP no. 275

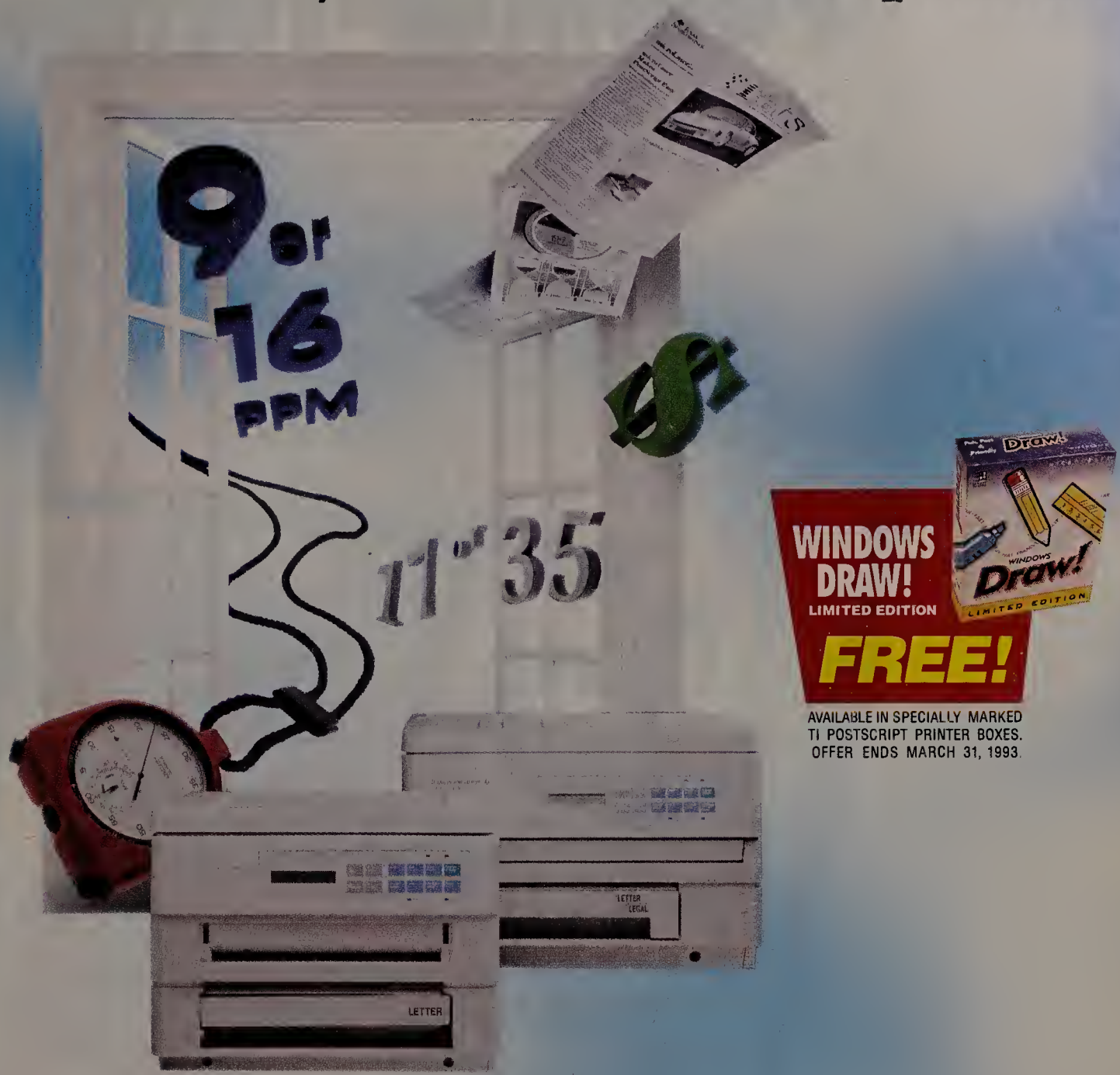
Truer Flush-Right Alignment in 1-2-3

In Power Tip No. 256 (August 1992, page 290), Shane Devenshire offered a *1-2-3* macro that right-aligned labels by inserting spaces. But if you used his macro, then reduced the width of your column and used it again, the macro didn't work.

This one will: In an unused part of your worksheet type {let @CELLPOINTER ("*address*"),@TRIM(@CELLPOINTER ("*contents*"))}, then select */Range • Name • Create* to name the cell \R. In the cell below it, type {edit}{home}{del}; below that, type '@REPEAT (" ",@CELLPOINTER("*width*")@LENGTH (@CELLPOINTER ("*contents*")))&" (don't forget the starting apostrophe); and below that, type {end}"{calc}~. From then on, pressing <Alt>-R when in a label cell will insert enough spaces to make it appear right-aligned, even if it already has more spaces than it needs.

Jim Carter
Huntington Beach, California

Four reasons to buy a TI microLaser™ printer.



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2. Performance When it comes to printing high-quality documents fast, microLaser really makes you look good. At either nine or 16 pages-per-minute, microLaser printers speed you through documents in a hurry. Plus PostScript means what you see on your screen is what you get on paper. You can even turbocharge your microLaser with a RISC processor for blazing fast graphics.

POSTSCRIPT® Software From Adobe

3. Reliability When you buy a printer, you want it to print. And print. And print. That's just what the microLaser does.

Take our personal microLaser Plus for example. With its high duty cycle of 10,000 pages-per-month* and a standard one-year limited warranty**, you can rely on your microLaser to work the first time, every time, for years.

4. Value Starting as low as $999†, there's a microLaser designed to fit any budget. From the single user all the way up to a network. Consider this, too: microLaser's average cost per page is only 1.9 cents‡, while some laser printers average around 3.3 cents. The microLaser not only makes sense, it saves you money, too.

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The microLaser PS17 has earned the 1990 *PC World* Best Buy award; microLaser PS35 has earned the 1990 *InfoWorld* Excellent Value award and 4½ mice from *MacUser*, October 1990.

Features	microLaser Plus Basic	microLaser Plus PS17/PS35	microLaser Turbo	microLaser XL Turbo
PPM	9 ppm	9 ppm	9 ppm	16 ppm
Emulation	HP LaserJet II	HPLJII/PostScript	HPLJII/PostScript II	HPLJII/PostScript II
Processor	68000	68000	RISC/8220	RISC/8220
Fonts	14 HP Fonts	17 or 35 Scalable	35 Scalable	35 Scalable
List Price	$999	$1,399/$1,499	$1,749	$3,649

TEXAS INSTRUMENTS

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Circle 242 on reader service card

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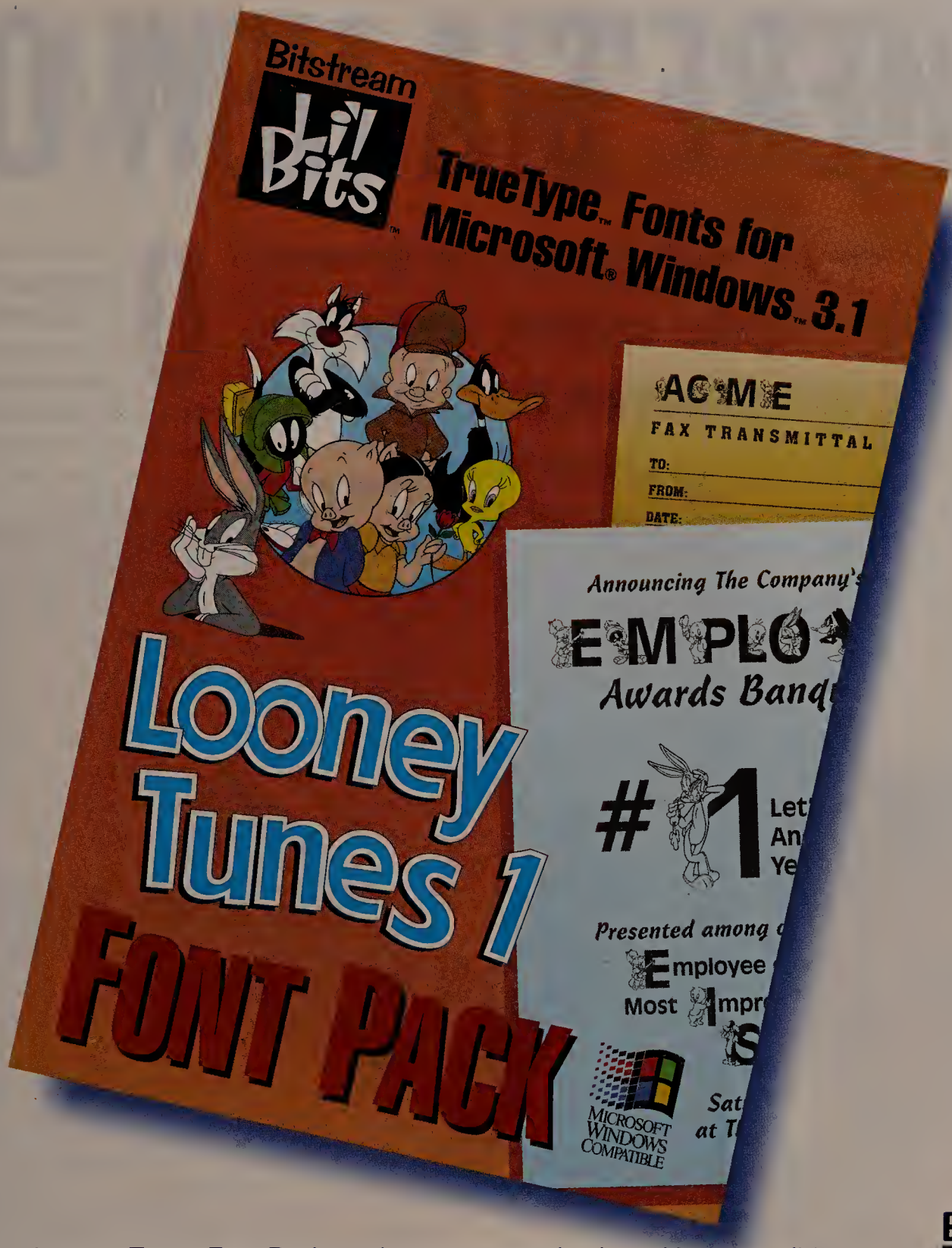

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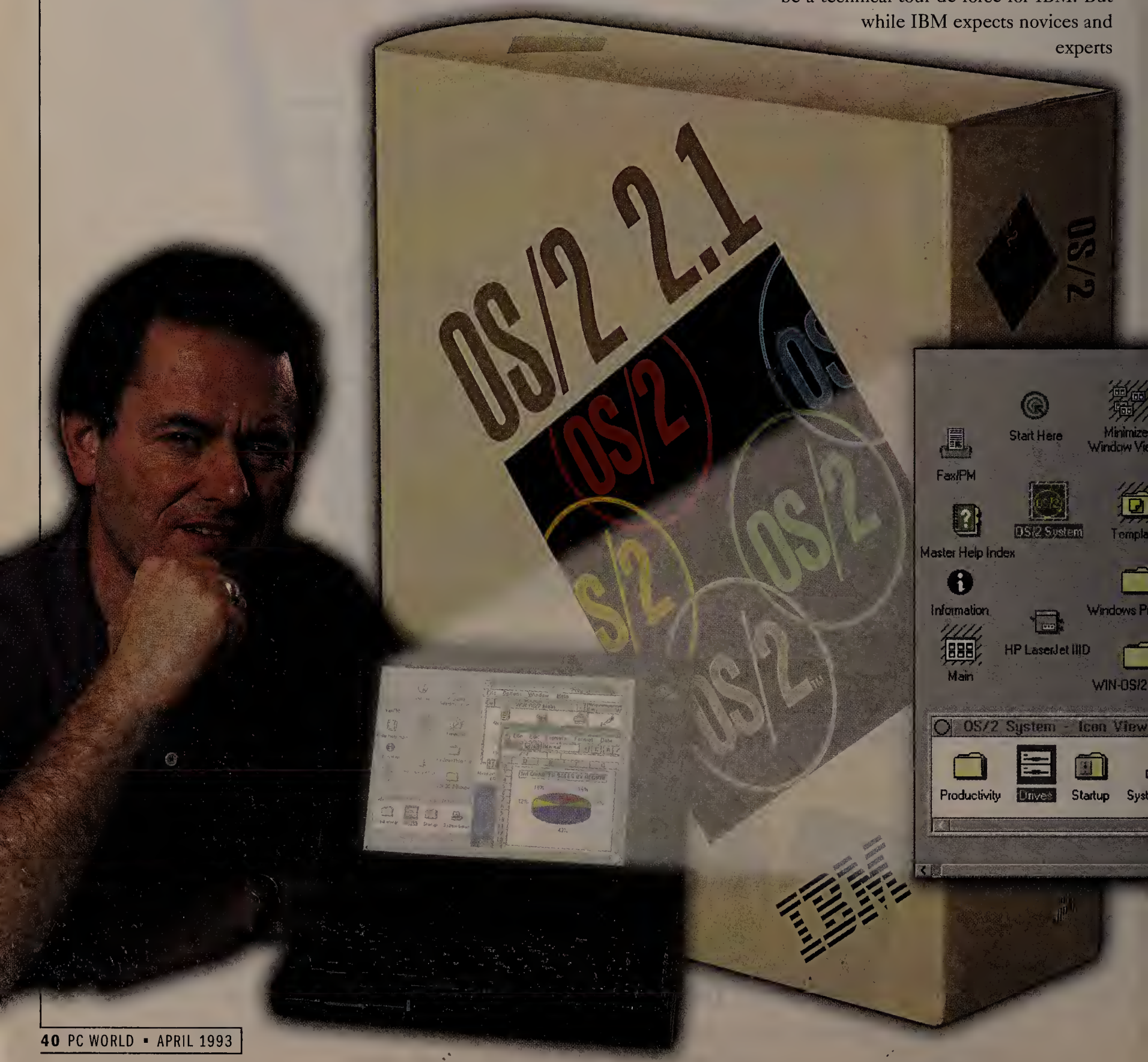
Circle 41 on reader service card

THERE'S A NEW OS/2

Improved Windows support with 25 percent faster performance and seamless integration, more drivers, and enhancements for mobile computing make OS/2 2.1 worth a look.

OS/2 2.1 offers more power and reliability than its predecessor, and it can do almost everything *Windows 3.1* can with comparable ease and speed. Due to ship in the second quarter, the operating system could prove to be a technical tour de force for IBM. But while IBM expects novices and experts



Edited by Russell Giltman

YOU MUST SEE

alike to flock to this new product, industry experts contend that the technical enhancements aren't significant enough to warrant a mass migration. Another key deterrent: the continuing dearth of mainstream 32-bit applications that fully exploit OS/2.

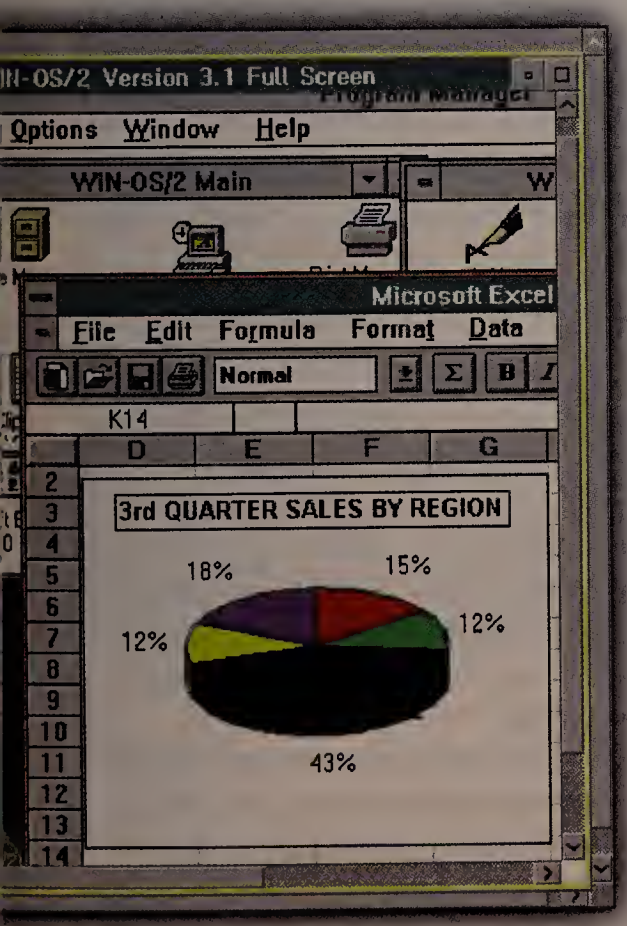
There is little disagreement that OS/2 2.1 will be popular with existing OS/2 users, primarily developers, engineers, and other technical types who work with mission-critical applications. But IBM isn't content with selling to existing users. John Patrick, vice president of sales and marketing for IBM's Personal Software Products division, says Big Blue expects that even devoted *Windows* users will switch to OS/2 because it offers advanced capabilities in a more crash-resistant, robust multitasking environment.

IBM also expects to attract novices, who will prefer the product's intuitive, Macintosh-like interface. Beginners will like the drag-and-drop features and the ability to manipulate documents from the desktop without first entering an application, proponents say. Although the previous version also had these features, the new product's ease of use combined with its ability to run DOS, *Windows 3.1*, and OS/2 applications will make it attractive.

Analysts counter that even if OS/2 2.1 is a superior product, it won't overcome the barriers to widespread acceptance. Users' resistance to upgrading their hardware will be one major issue. To run OS/2 in a spritely manner, you will need a 486-based PC with at least 8MB of RAM and a hard disk that's 100MB or larger. To install the product, you will need time and patience. Although the basic setup isn't difficult, installing the OS from 19 or so disks can take about 40 minutes. This factor may deter some users and MIS departments from converting their systems to OS/2, says Jeffrey Silverstein, editor and publisher of the *Software Industry Bulletin* in Stamford, Connecticut.

Windows also enjoys more support from software vendors. In a survey of widely available applications, Jeffrey Henning, senior analyst at BIS Strategic Decisions, a Norwell, Massachusetts, market research firm, found that *Windows* programs outnumber OS/2 applications six to one. Many of the OS/2 applications are developers' tools, of little interest to end users. Moreover, the OS/2 products designed for end users don't offer significant advantages over their *Windows* counterparts, Henning says.

These issues may limit OS/2 2.1's success in the near term. Henning expects OS/2 2.1 to attract some 400,000 new users in 1993, increasing the total number of OS/2 users to about 1.5 million, compared to 13.7 million for *Windows*. The new users will be mainly from large companies that buy strictly from IBM. One such buyer is Wayne F. Dunn,



OS/2'S NEW LOOK: Windows runs seamlessly and faster. John Patrick, vice president of sales and marketing for IBM's Personal Software Products division, expects this will lure Windows users.

News Monitor

NEW FROM COMPAQ: The popular ProLinea line is getting local bus graphics and 1024 by 768 resolution in early March as part of a massive new product sweep by the Houston, Texas, PC maker. A new 66-MHz 486DX2 ProLinea, also with local bus graphics, will be introduced along with three new Contura notebooks. All three notes will use the 486SL-25 CPU. One of the two color notes uses active-matrix technology; the others use an improved passive-matrix technology. Compaq is also enhancing its Deskpro/M. New models will come with 8MB of RAM rather than 4MB, and some Deskpro/i models will be preconfigured with ethernet controller cards. Pricing was not set on these products at press time.

DELL AND IBM CUT PRICES: PC price cutting continues. In February Dell slashed $50 to $500 from portable and desktop PCs across several product lines, including some new 486s announced in December 1992. Among notebooks, the biggest price drop was on the 3.6-pound 320SLi: Previously $2548 with a 20-MHz i386SL processor, 4MB RAM, and 120MB hard drive, it now lists for $1999. The 325NC, a passive-matrix color notebook with a 25-MHz i386SL processor, 4MB RAM, and 120MB hard drive, went from $2949 to $2549. Among desktops, the 486SX-based, upgradable 425s/L and 433s/L models with local bus video dropped $200 to $300, depending on configuration. New service options include 7-day, 24-hour tech support.

(continued on page 43)

PHOTO: MICHAEL JUSTICE; ILLUSTRATION: PHIL ANDERSON

OS/2 2.1 Key New Features

Run Windows in native mode

- Includes Windows 3.1 with File Manager and TrueType fonts
- Works with more Windows applications
- Improved performance of Windows applications

Supports additional devices

- Common SVGA graphics adapters
- Popular printers, including HP LaserJet 4
- CD ROM drives, including NEC and Hitachi

Adds portable computing features

- Supports PCMCIA Level 1 devices and pen-based systems
- Advanced power management features improve battery life
- Creates oversize mouse pointer

Continued from page 41

manager of end-user support for the Massachusetts Bay Transportation Authority. Dunn plans to convert about 400 *Windows*- and DOS-based systems to OS/2 2.1 by September. Almost all these units are IBM PS/2s. He'll provide users with the requisite 486 power either by replacing existing units with new PS/2s or by upgrading the CPUs with a 486 Micro Channel card.

Windows Module

Improved *Windows* support is the key addition in OS/2 2.1. At press time, the operating system was still in beta. The following is an overview of the *Windows* features that are expected in the final version of 2.1.

The *Windows* module is actual *Microsoft Windows 3.1* source code that has been modified to run on the OS/2 kernel. IBM claims that it can run both standard and enhanced modes. OS/2 2.0 included *Windows 3.0* code, but that version was not able to run enhanced mode, which *Windows 3.0* itself could run.

The *Windows 3.1* components let OS/2 2.1 run more *Windows* applications than OS/2 2.0, including programs that require the enhanced-mode and *Windows 3.1* features. The new operating system can run *Windows* applications seamlessly in an OS/2 window. This capability means that it's now possible for you to display *Windows*, DOS, and OS/2 applications in reduced views, which makes for easier monitoring and more efficient cutting and pasting.

This seamless capability also lets you place integral *Windows* programs such as File Manager and Program Manager on IBM's graphical desktop, the Workplace Shell. As a result, you won't have to waste time opening OS/2's *Windows* module in order to use these features—you simply double-click an icon located in the same place as the OS/2 icons. In addition, users trading up to OS/2 will be able to launch DOS, *Windows*, and OS/2 programs and manipulate files by using the *Windows* tools with which they are already familiar.

WAYNE F. DUNN: Moving MBTA from Windows to OS/2.

The improvements to the graphics engine address a key complaint that users have voiced about O2/2 2.0—slow *Windows* performance. In OS/2 2.1, IBM claims, it has improved *Windows* performance by approximately 25 percent over the last version, and a company spokesperson reports that beta users are finding no perceptible difference between running *Windows* applications under OS/2 2.1 and running those same applications under *Windows 3.1*.

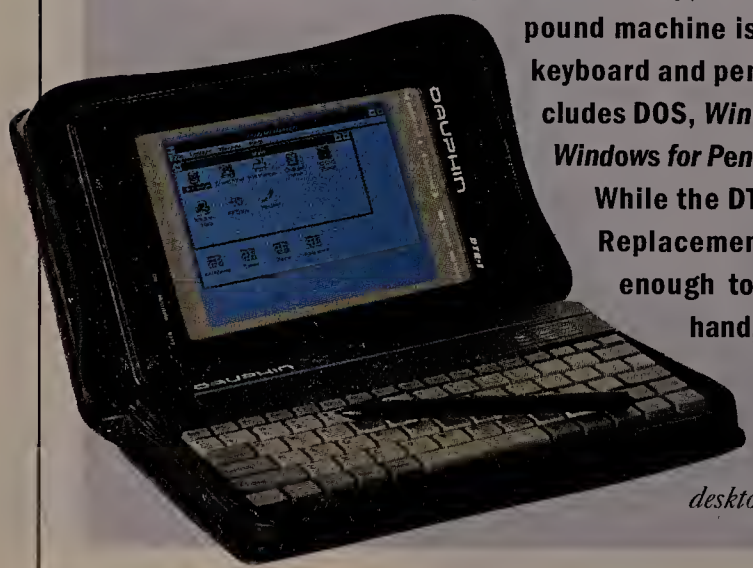
—Randy Ross

Portable Power in a 2.5-Pound Package:

The DTR-1 from Dauphin Technology weighs one-third as much as today's average notebook, yet it boasts much the same functionality. Powered by a 25-MHz Cyrix 486SLC chip, this portable 2.5-pound machine is designed for keyboard and pen input and includes DOS, *Windows 3.1*, and *Windows for Pen Computing*.

While the DTR-1 (Desktop Replacement) is small enough to hold in your hand, Dauphin says don't call it a personal digital assistant. Measuring 9 by 5 by 1¼ inches, this portable has a separate 1-pound, 9-inch keyboard, a 6-inch backlit VGA display, and a Hewlett-Packard Kittyhawk 20MB hard drive (with 40MB available later this spring). There's also an optional internal ethernet adapter, and a 9600-bps internal fax-modem is standard. You can take advantage of the unit's pen right from the start—a slimmed-down version of PenWare's *PenCell* spreadsheet software is included.

The internal battery lasts 2 hours. An external battery pack that also serves as a screen cover pops on to add 8 more hours, the vendor says. If you need additional storage, Dauphin also offers an external version of its 85MB DynaDrive removable-cartridge hard drive. Plug a DynaDrive into the IDE port of the DTR-1, and the mobile power of this machine gets even better. The street price is expected to be in the vicinity of $2500. Dauphin Technology, 800/782-7922. Reader service no. 799



DAUPHIN'S DTR-1 puts a desktop in your hand.

PHOTOS: LEFT, FRED STIMSON; TOP, RICK FRIEDMAN

Tips to Maximize Modem Speed

With street prices dropping below $300, high-speed V.32 and V.32bis modems that send and receive data at speeds up to 57,600 bits per second (using data compression) are becoming increasingly popular. However, customers are finding that getting the extra speed may not be as simple as installing the modem and loading a new driver. Using a slow *Windows* communications driver, an outdated serial port, or an ill-chosen protocol can make your high-speed modem perform more like the 2400- or 1200-bps slowpoke you replaced.

Getting the most from your high-speed modem may require additional hardware and software upgrades, says Rick Moen, a BBS systems operator and member of the San Francisco PC Users Group. For example, many XT, 286, and even some 386-class PCs have serial ports that can't handle speeds beyond 20 kilobits per second. Owners of these systems may want to buy high-speed serial boards, typically priced at $200 or less, from companies such as Hayes, UDS Motorola, and DigiBoard. *Windows 3.0* users may finally want to upgrade to *Windows 3.1*, which includes an improved communications driver that supports the 16550 UART chip necessary for high-speed data links. Another solution is to upgrade to a communications program that supports the ZMODEM protocol, which has a number of error correction and speed enhancements that can give you faster file downloads.

Beyond the system bottlenecks, high-speed modem users are finding they must pay a stiff premium for 9600-bps access to on-line services like CompuServe and GEnie—typically twice as much per hour as for 2400-bps access. "What upsets me is that we pay a high price for higher-speed modems to find the only thing we save is time," says CompuServe member Jim Wesley, a civil engineer from Linden, New Jersey.

A CompuServe spokesperson says that 9600-bps service costs more because users "receive information twice as quickly" and hence are on line for a shorter period.

But users of high-speed modems can save themselves some money if they use an on-line service correctly, advises Moen. Among his suggestions: Unless you are downloading files, you will find that it's a good idea to stick to the 2400-bps line to read mail and browse the service. One additional solution: You can turn to a communications program such as Mustang Software's *QmodemPro*, which automatically downloads your E-mail, or to off-line tools such as *AutoSIG*, which is free, or the $79 *TAPCIS*—utilities that automate on-line navigation of conferences, message capture, and file downloads on CompuServe.

—Jeff Bertolucci

Break the On-Line Bottleneck

Tips for optimizing high-speed modems

- If your PC's serial port is limited to 20 Kbps and you use an external modem, buy a high-speed serial board, typically priced under $200.
- For faster file transfers, use the ZMODEM protocol.
- Cut on-line services' hourly charges by using off-line readers in programs like QmodemPro and CompuServe Information Manager for Windows.
- If your on-line service's 9600-bps line costs extra, use it only to transfer files. Use the cheaper 2400-bps line to browse the service.
- Windows 3.0 users should upgrade to Windows 3.1, with its enhanced communications driver.

News Monitor

(continued from page 41)

Among the first to respond was IBM, which cut the price of its ThinkPad 300, a 25-MHz 386SL notebook with 4MB RAM and an 80MB hard disk, to $1999 from $2375. The 120MB model went from $2575 to $2199. Prices of IBM PS/ValuePoints also dropped between $70 and $140.

MICROSOFT CHANGES DOS 6.0: While it grapples with a patent infringement suit, Microsoft Corporation has made several changes to its DOS 6.0, including removing a small piece of data compression technology. It took out the compression option called MaxCompress soon after Stac Electronics lodged a patent infringement suit on January 25. Stac claims Microsoft infringed on two patents in DOS 6.0's DoubleSpace data compression utility.

Microsoft has temporarily removed MaxCompress while it examines the suit, says Collins Hemingway, manager of systems public relations at Microsoft. The MaxCompress option allows 5 to 6 percent more compression than the standard compression utility, with a trade-off of slower speed, he says. Most of DOS 6.0's compression capability remains. (Microsoft could decide to reinsert the option before DOS 6.0 ships at the end of March or make it available later.) The company also made two DOS 6.0 changes unrelated to the suit: It removed one feature that allowed auto-installation on a network and another that permitted auto-installation of clients on *Microsoft Mail*.

(continued on page 45)

ILLUSTRATIONS: RIGHT, JEFF BERLIN; TOP, PHIL ANDERSON

Pinnacle Delivers Room to Grow and Data to Go

How many megabytes is enough? 80? 120? 230? Whatever you decide you need today, you can bet you'll be scratching for disk space six months from now. Most of tomorrow's graphical applications will sport double-digit storage requirements *before* you add files and font and graphics libraries.

But Pinnacle Micro's PMO-130 optical drive gives you the flexibility of using as many 128MB removable, rewritable optical disks as you'll need into the next century—and without a trade-off in speed or size over other storage solutions.

The PMO-130 is fast; Pinnacle claims a 19ms effective access time—about twice as fast as past erasable-optical drives and several times faster than very-high-density floppies or flopticals. That puts the PMO-130 just a step behind the fastest hard drives.

Iomega's new Bernoulli 90 Pro removable-cartridge drive is comparable, professing to deliver 18ms effective access, but it is almost three times the size of the Pinnacle drive. The internal PMO-130 is a diminutive 3½ inches, and even the external model's 6-by-2.7-by-8.3-inch case is small enough to squeeze into any desktop storage niche. Both models come with a SCSI adapter card, cables, and utility software, and for those with extreme security concerns, nothing is safer or more convenient than the drive's $79 disks.

The PMO-130's size and speed result partly from a new split-optic data recording design that combines a laser, a movable prism, and an all-but-stationary read/write head to reduce seek times and weight. But the fast reads are largely attributable to the intelligent way the PMO-130 queues data for fast access with the help of on-board processor and memory.

Split your compute time between two sites? A 3½-inch optical disk in your pocket offers a floppy's portability (without the serial-transfer hassles) and greater capacity than even a removable hard drive. Adherence to industry standards means a PMO-130 disk can be read or written on by any vendor's ISO/ANSI-compatible device and

Pinnacle PMO-130

Add as many megabytes as you want to this fast, lightweight storage solution.
Pricing: External $1895, internal $1695
Availability: Immediate
Pinnacle Micro; 800/553-7070, 714/727-3300, 714/727-1913 (fax)
Reader service no. 800

LapLink V Offers Drag-and-Drop, LAN Support

TEST DRIVE

What more could you do to improve *LapLink*, the venerable file transfer utility from Traveling Software? How about peer-to-peer file transfer over a Novell network? Add drag-and-drop. Toss in unattended file transfer, background transfer under *Windows*, and an interface that displays files and directories graphically and makes *LapLink* easier to use. Keep the price at $169.95, and you have yourself a sure hit.

Rather than cram a collection of file and disk management utilities into *LapLink V*, Traveling Software has opted for quality. Several well-designed enhancements, including network support, both broaden and simplify file transfer. You can exchange files with other *LapLink V* users on a NetWare network, bypassing the file server. Using NetWare's IPX communications protocol, *LapLink V* transfers files directly between PCs on a network, freeing up the server for other tasks and conserving its disk space.

Certainly you don't want everyone on the LAN to have unlimited access to *all* your files and directories. Perhaps you want your Sales directory open to all, but your Budget directory open only to senior management. *LapLink V*'s beefed-up security lets you specify who has rights to your computer, which drives and directories they can open, whether they can copy or only read files, and whether they need a password in order to perform these tasks.

Network installation and use are both straightforward. *LapLink V* automatically recognizes a LAN connection and includes the familiar menu-driven interface for network, cable, or modem link. The new version also operates over wireless LANs and cellular modems, meaning you can transfer spreadsheets and other documents even if a wired connection is impossible.

LAPLINK STILL HAS ITS FAMILIAR CABLES but adds NetWare support.

Drag-and-Drop

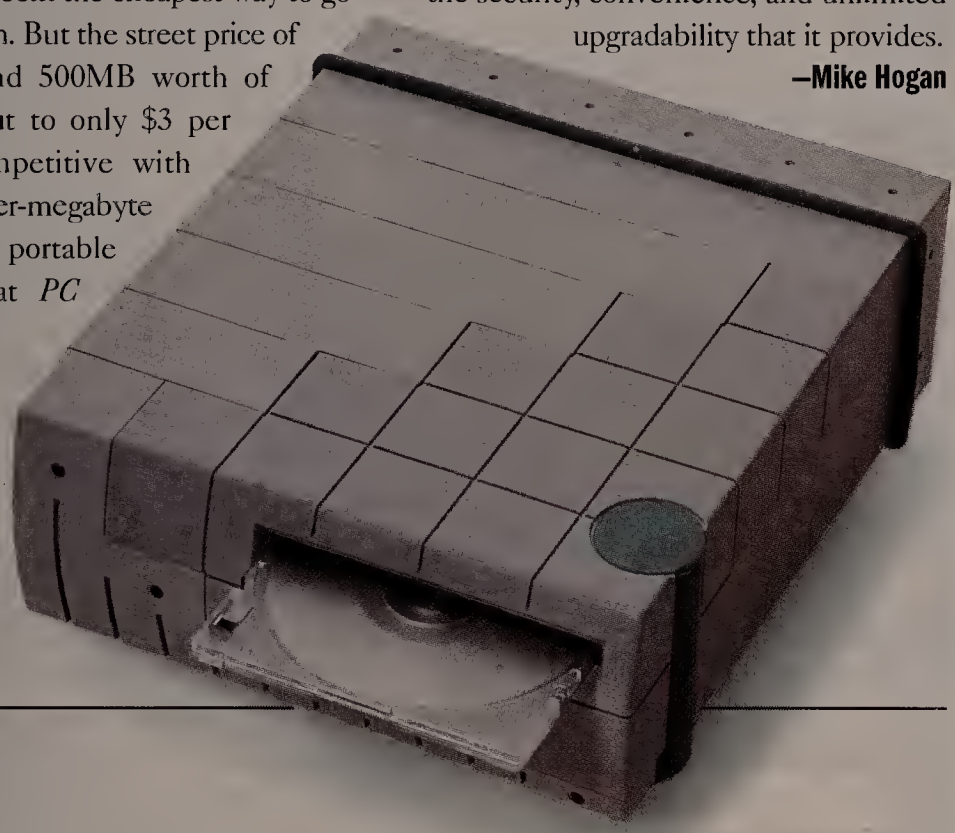
While still a DOS program, *LapLink V* includes some *Windows*-inspired enhancements, such as drag-and-drop—the ability to copy or move files by dragging them with your mouse from the source directory to the target directory. *LapLink*'s split-screen interface makes this task much easier; half the screen shows your PC's files, the other

is just as useful for storing digital audio, digital video, or other multimedia forms.

The PMO-130 list price is $1895 for the external model and $1695 for the internal, so buying one for work and another for home may not seem the cheapest way to go in the short term. But the street price of a PMO-130 and 500MB worth of disks works out to only $3 per megabyte, competitive with the $5-to-$15-per-megabyte cost of a single portable hard drive that *PC World* found in its September 1992 roundup. And as your storage needs increase, the figures only get better.

The PMO-130 isn't for every computer user. But an increasing number of us need the security, convenience, and unlimited upgradability that it provides.

—Mike Hogan



THE PMO-130 optical drive (right) uses 3½-inch rewritable disks (left) and has a 19ms access time.

half those of the target PC. Also, the program's new graphical look includes file and directory icons, as well as a tool bar at the bottom of the screen for easy access to common tasks such as copying, moving, and deleting files.

LapLink V has been fine-tuned to run better under *Windows*, too—particularly in 386-enhanced mode, where *LapLink* takes advantage of *Windows'* multitasking capabilities to transfer files in the background. Start a *LapLink* transfer session, hot key over to *Excel* or any other *Windows* program, and the transfer will continue unaltered. Similarly, other *LapLink* users can access your computer while you're working in *Windows*, a useful feature for exchanging files over a network or for prescheduled daily backups. *LapLink V* even comes with its own enhanced *Windows* communications driver capable of serial cable transfers of 115,200 bits per second, and the utility supports many of the newer high-speed fax modems from Hayes, Intel, Practical Peripherals, U.S. Robotics, and a number of other companies.

Smarter SmartXchange

LapLink V's improved SmartXchange feature now has a "scheduled playback" option that lets you schedule unattended file transfers, good for backups or for exchanging files after business hours when phone rates are their lowest. The new monthly calendar and scheduler makes planning as simple as pointing to a date, clicking the mouse, then selecting the date, time, and frequency of your transfer (such as daily, weekly, monthly, weekdays, or weekends). Even *LapLink* novices should feel comfortable using this feature for the first time.

Other enhanced SmartXchange features

News Monitor

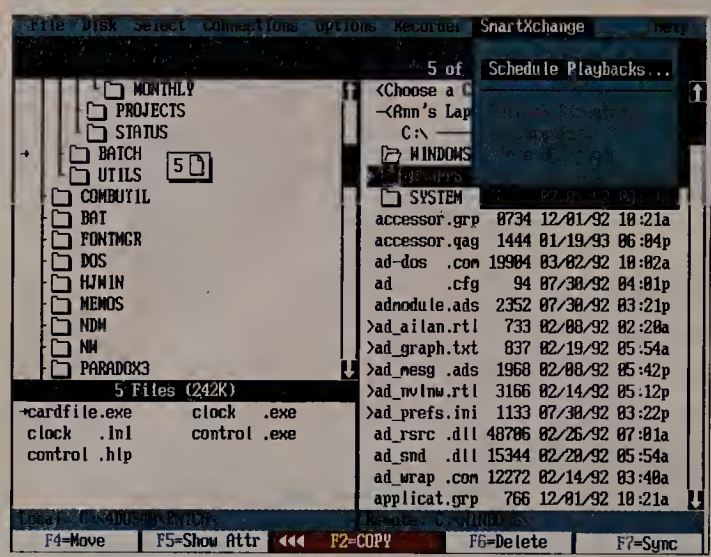
(continued from page 43)

PENTIUM PCs POSTPONED: The March introduction of systems based on Intel's Pentium microprocessor has been delayed, and few Pentium PCs will be available until early summer. Intel has asked vendors to wait until late May to introduce Pentium systems, but the company will unveil technical details of the chip in March when it begins shipping the CPU to system makers. Intel says the delay is designed to fill the distribution network and avoid huge backlogs, but analysts say Intel and PC vendors also need the time to improve manufacturing yields.

LANTASTIC 5.0: Look for more workgroup features in the new version of *LANtastic*, Artisoft's peer-to-peer network operating system. Bundled with the system is a group scheduler that lets you and your co-workers coordinate appointments over the network. Improved security extends to individual files within directories. *LANtastic 5.0* also lets a group of users share a *Windows* scrapbook, which can include text, graphics, and sound items. *LANtastic 5.0* users who have Artisoft Sounding Boards (the company's add-in sound card) can have real-time conversations over the LAN—no phone lines required. *LANtastic* now supports 500 concurrent users per server and enables users to access networked drives, printers, and other resources easily without having to know where the device resides.

—Jeff Bertolucci, Russell Glitman, Laurianne McLaughlin

ILLUSTRATION: PHIL ANDERSON; PHOTOS: FRED STIMSON



LAPLINK V OFFERS ICONS and pulldown menus.

EXCHANGE FILES ON NETWARE with LapLink V.

Continued from page 45

include a "clone directory," which lets you transfer the entire contents of one directory to another, and a "refresh directory" for transferring only new or updated files. *LapLink*'s powerful Synchronize command updates two directories so that each contains the latest copies of your files. This handy feature is useful if you work on both a laptop and a desktop. With this feature, *LapLink* will ensure that your frequently revised spreadsheets, documents, and presentations on both your computers contain the most current versions.

While *LapLink* is designed for file transfer, it makes a pretty tolerable file manager as well. It makes it possible for you to erase entire directories—complete with subdirectories and files—using the Delete command. And *LapLink V*'s tree mode displays a hard drive's directory structure graphically, making it easier for you to track down subdirectories and files.

LapLink V comes in two flavors. The $169.95 single-user version includes cables for connecting two PCs via the serial or parallel ports. The $99.95 network version, *LapLink V for NetWare*, designed for the MIS professional or LAN administrator who wants to set up peer-to-peer file transfer on the network, does not include cables. However, both the single-user and the network version work across networks running Novell NetWare 2.2 or 3.11, and both of them will transfer your files over modems.

While *LapLink V*'s list of new features is impressive—especially the built-in LAN support—we found this version's ease of use particularly noteworthy. The menu-driven interface, *Windows*-like drag-and-drop features, and graphical file and directory icons make transferring files less daunting for the neophyte and even simpler for the *LapLink* veteran.

Michael McClure, *LapLink V* beta tester and PC coordinator for ICN Pharmaceuticals in Costa Mesa, California, is especially impressed with the program's new networking features. "We're in the process of automating our outside sales force, and we want them to dial in to the network and download the files they need," McClure says. "This product is perfect for that, particularly because [our employees] are already familiar with *LapLink*."

—Jeff Bertolucci

LapLink V

This venerable file transfer utility gets network support and drag-and-drop capability.
Key Features: NetWare file transfer • Unattended file transfer • Background operation under Windows
Pricing: Single-user version $169.95, LapLink V for NetWare $99.95
Availability: LapLink V immediate, LapLink V for NetWare May
Traveling Software; 206/483-8088, 206/487-1284 (fax)
Reader service no. 801

Hotels Offer PC Services in Battle for Guests

Frustrated by hotel rooms that don't offer telephones with data ports? Ever forget to load the spreadsheet file for your presentation on your notebook before leaving the office? According to hotel managers and travel planners, downtown hotels are fighting hard for business customers after a two-year financial slump, and many are moving to offer services that make computing on the road easier for their guests.

Travelers can make the most of the situation by price and feature shopping, says Jerry Aransky, vice president of industry relations at Thomas Cook Travel in Cambridge, Massachusetts. "People are not yet willing to pay extra for computing services, but often they will book because of it. The hotels need [these services] as a marketing tool," he says.

Consequently, hotel business centers are improving their facilities and competing on prices. Most have PCs, word processing and spreadsheet software, a printer, and a fax machine. Some offer bargain fees, like the Hyatt Regency O'Hare in Rosemont, Illinois, which has a $5 rate to use its HP LaserJet printers, with unlimited pages. Hyatt will also provide a PC and a printer for $25 an hour.

An easy tip: To make traveling easier, request a room with a no-fuss data port for your notebook, advises Aransky. More hotels offer this service. Marriott is installing phones with data ports whenever it revamps a hotel phone system, says Gordon Carncross, a regional director of sales and marketing for Marriott Hotels.

GORDON STUDER

Windows at your fingertips.

WinBook, the first notebook computer designed specifically for Windows.

The new WinBook™ gives you all the power to run Windows, and the unique design to make it easier to use.

It features a built-in, centered trackball, which allows you to control cursor movements effortlessly with either thumb—without having to lift a single finger off the keyboard.

And the WinBook comes with the power and speed needed to run Windows effectively. You get 4MB of memory, the new ultrafast 486 SLC/E 25-MHz processor and the Motorola chipset which provides eight power-saving features, even while running Windows.

The WinBook was engineered for Micro Electronics, a division of MEI/Micro Center, Inc. MEI is America's leading direct source for computer accessories. Micro Center has been selling PCs for more than 14 years—longer than IBM or Compaq—with over 736,000 units sold. And with over 2.2 million satisfied customers nationwide, they have developed a superior support staff, including top engineers and technical specialists. So you always get the highest quality product at the lowest possible price.

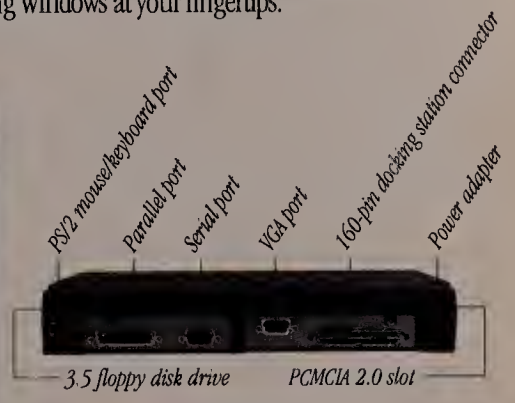
Before you choose a notebook computer, look at the only one designed for Windows.

The WinBook from Micro Electronics
—putting Windows at your fingertips.

Dual-button trackball centered under keyboard.

The 5.4 lb. WinBook was designed by award-winning Palo Alto Design.

- *Fast-acting Hitachi LCD screen for no cursor loss.*
- *512k video RAM for simultaneous display.*
- *Includes a 9600 baud send/4800 baud receive fax/2400 baud modem.*
- *Industry standard PCMCIA 2.0 slot for future expandability.*



Eight Power-Saving Features

Including sleep mode for all I/O ports, HDD, and FDD to increase battery life.

Longer Battery Life

The WinBook features NiMH 2300 MA batteries with gold-plated contacts. This allows it to run much longer than units with traditional NiCAD batteries—and there's no memory effect.

Warranty

- *45-day unconditional money-back warranty.*
- *24 hour burn-in protection.*
- *One year on parts and labor.*

Service

- *72-hour service turnaround guarantee.*

Support

- *Toll-free technical support for the life of the computer.*

Payment Options

Visa, MasterCard, Discover, personal checks, COD's with cashiers check and Purchase Orders with approval.

Prices do not include applicable taxes, handling or shipping charges. Prices and specifications subject to change without notice.

Docking Station

With the available docking station, your WinBook instantly becomes a full-function desktop computer. Its two expansion slots allow you to add peripherals such as monitors, hard drives, CD-ROMs or an extended keyboard. **And it's just $399!**

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Specifications

Size/Weight
- 11" x 8 3/4" x 1 3/4"
- 5.4 lbs with battery

Pointing Device
- 16mm Alps dual-action, Microsoft compatible internal trackball

Battery
- 4 hours under normal usage
- Sanyo NiMH (no memory effect) 2300 MA with gold-plated contacts
- Worldwide auto-sensing AC adapter
- Quick 2-hour recharge

Power Management
- 8 power-saving features

Processor & Memory
- 486 SLC/E-25 CPU
- 4 MB RAM
- 1 MB ROM for Ami BIOS
- Motorola chipset & Cirrus VGA 6420
- 1k Internal Cache

Drives
- One built-in 1.44 MB 3.5" floppy drive
- Internal 120 MB (15ms) hard drive
- 180 MB (15ms) hard drive optional

Software
- Comes loaded with MS-DOS 5.0 and Microsoft Windows 3.1

Display
- Super-twisted transflective 64 gray scale, 10" LCD with CCFT-backlit
- 640 x 480 VGA resolution for LCD and 1024 x 768 for external monitor with 512k simultaneous display
- Adjustable contrast and brightness
- Visible LED indicator on cover-down

Keyboard
- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0 mm keyboard spacing

Modem
- Fax-9600 baud send/4800 baud receive/2400 baud modem

I/O Ports
- PCMCIA 2.0 slot
- Serial: 9-pin connector
- Parallel port
- Video: 15-pin connector for CRT
- 160-pin docking station
- PS/2 mouse interface/keyboard interface

Options
- 180 MB (15ms) hard drive
- 8 MB RAM
- Coprocessor
- Docking station

The WinBook for only $1699
- 486 SLC/E 25 MHz
- 120 MB (15ms) HDD
- 4 MB RAM
- Fax Modem

$1499
- 80 MB (15ms) HDD
- 2 MB RAM
- Fax modem, Windows optional

No-risk, 45-day unconditional money-back guarantee.

Order the WinBook today. Call 1-800-468-1242

Micro Electronics, a division of MEI/Micro Center, Inc. • 1160 Steelwood Rd • Columbus, OH 43212 • Fax: 1-800-448-0308 • 8am–9pm EST, Monday through Friday • 9am–4pm EST Saturday

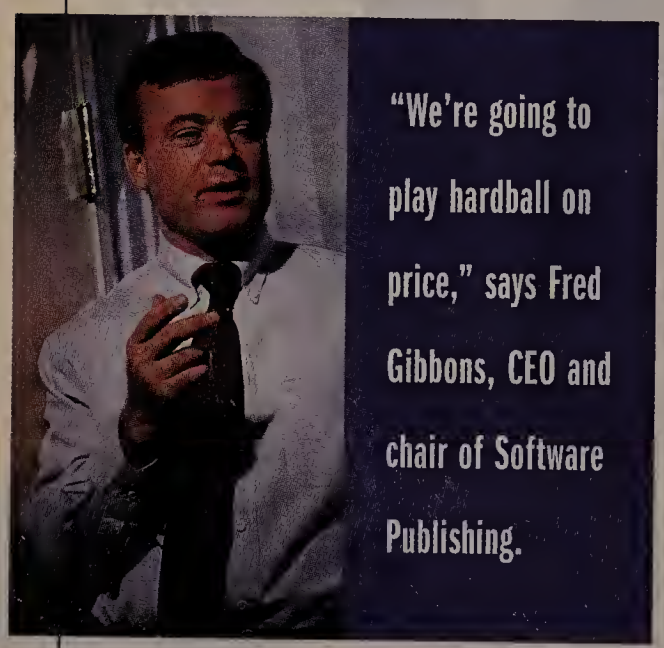
Circle 197 on reader service card

Deals Abound in Software Price Skirmish

The inevitable aftershocks of last year's PC price war are rocking the software market. Rather than invest hardware savings in software, buyers are trying to ratchet down expenditures for mainstream business applications to maintain the traditional ratio of 20 to 40 percent of the system's cost. "For folks who now spend $1000 to $2000 on their system, that means a lower software threshold," says David Watkins, Borland vice president for product marketing.

In an all-out effort to seize a bigger share of those tighter budgets and grow their market share, several companies, including Borland, have temporarily slashed prices. Others offer upgrades from competitors' products at a fraction of list price. And increasingly, new *Windows* software is coming to market for hundreds of dollars less than older DOS versions.

The software price war began in earnest late last year when Microsoft offered its *Access* database for an introductory fee of $99. By the time the offer expired on January 31, Microsoft had received orders for 750,000 copies, a staggering number considering its estimate that in 1992 *all* databases sold a total of 1.2 million copies.



"We're going to play hardball on price," says Fred Gibbons, CEO and chair of Software Publishing.

Borland returned fire with both barrels. Aiming first at *Access*, Borland released *Paradox for Windows* with an introductory $139.95 price tag (the offer expires April 30). Recognizing that it should have been just as aggressive with *Quattro Pro* and *Quattro Pro for Windows*, Borland slashed their prices to $99.95 each for the same period. The showdown on the software shelves has users wondering which way they should turn for the next deal.

There's a lower software spending threshold, says David Watkins, Borland's vice president for product marketing.

Not so fast, says Software Publishing Corporation CEO and chair Fred Gibbons. He suggests the competitive dynamics at play between Borland and Microsoft do not apply to all companies and does not expect the Borland/Microsoft price battle to spread.

Nonetheless, Gibbons and other vendors may have to react. "When we are dealing with accounts [that make] thousands of purchases, we're going to play hardball on price," he says..

Most sales of these new products are for evaluation, says Eileen Rudden, vice president of product marketing at Lotus, and no similar deal is in the works for *1-2-3*, she says.

Not that there aren't plenty of deals for the careful shopper. "I can't remember a time when I said, 'Oh, there are no specials out there,'" says Rose Hultgren, director of marketing at Texas reseller Software Spectrum. Hultgren, who has been "managing the [software price] chaos for some time now," says her company handled 14,000 different software titles last year.

Hultgren recommends buyers consider such alternatives to pure price cuts as software suites, where bundles of products are offered at a discount, and competitive upgrades, where owners of product A can switch to a new version of product B at a greatly reduced price. Suites are ideal for first-time buyers; competitive upgrades are supposed to be restricted to registered owners.

Such deals are widely available. Last year Lotus offered SmartSuite, a half-price bundle of the *Windows* versions of *Ami Pro*, *1-2-3*, *Freelance Graphics*, and *cc:Mail*. Suites are more attractive to vendors, says Rudden, because they increase the overall number of applications sold. "On a dollars-per-desktop basis, because software suites increase our market penetration, we don't lose money on them," she says. Microsoft, too, plays the suites game. *Microsoft Office for Windows* includes *Word*, *Excel*, *Picture Publisher*, and *Mail*, all for about 1½ times the cost of *Word* alone. InfoCorp software analyst Chris Le Tocq predicts that as software integration and compatibility issues become more important, many companies will team up (as in Borland and WordPerfect's WinWin discount suite of *WordPerfect for Windows* and *Quattro Pro for Windows*).

So while Borland's David Watkins says you'll never see *Paradox for Windows* at $139 again, remember these deals help the vendors as much as you and are not going away. Says Hultgren, "Marketing makes the market better. It's databases now, and it could be spreadsheets next."

—Richard Melville

PHOTOS: TOP, ROBERT HOLMGREN; LEFT, ANDY FREEBERG

LEARJET 31A, SPEED: MACH .81, $4.7 MILLION
"THE MOST SOUGHT AFTER LEAR BUSINESS JET IN THE AIR"

SPECIALIZED "TANDEMONIUM," SPEED: 50 MI/HR +, $25,000 +
"WORLD'S FASTEST TANDEM BICYCLE ON THE GROUND"

COLANI MOUSE, SPEED: 1 FOOT/.5 SECOND, $79.00
"WORLD'S MOST COMFORTABLE MOUSE IN YOUR HAND"

Right hand version shown (left hand available)

NO MORE WRIST PADS!

Famed European designer Luigi Colani has created the most ergonomic mouse input device on the market. Available in both Mac and PC versions in black and grey. This high-quality mouse boasts a natural, ergonomic fit. Dealers call for special display offer. Available exclusively through Moustrak, Inc.
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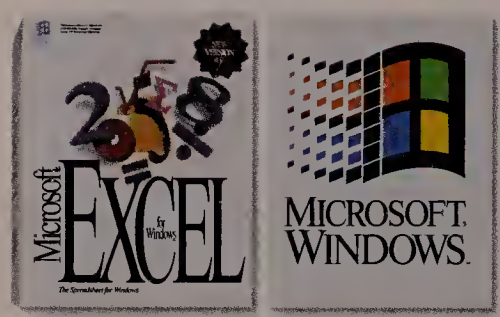
AVAILABLE AT: COMPUTER CITY SUPERCENTER

MOUSTRAK

2701 Conestoga Drive • Carson City, Nevada 89706
1-800-221-6687 or 702-884-1925

Circle 143 on reader service card

We figured it would take a Wizard to make your job easier.



The real magic of Microsoft® Excel is that all of its innovative tools have been designed to do just one thing: make your everyday work easier.

In order to achieve this goal, our product development team spends countless hours studying the way you work with your spreadsheet. Listening to your needs. And even following your suggestions.

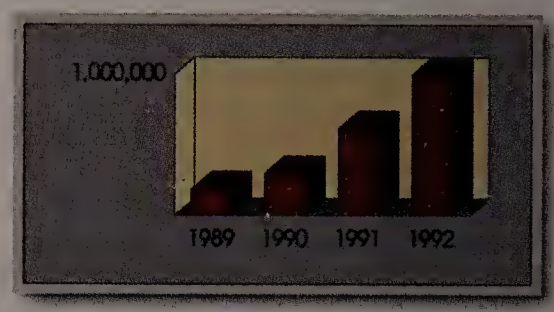
For example, we discovered that with your current spreadsheet it's often difficult to make the kind of charts you want. So we designed a tool called the ChartWizard. It's so easy to use, it actually helps you create a number of smart-looking charts on-screen, step-by-step.

What about the things you have to do over and over again? The things that are time-consuming and tedious? Like filling in dates. Adding up numbers? And formatting worksheets?

Well, with Autofill, Autosum,™ and Autoformat, you can now do all these everyday tasks with just a few clicks of the mouse. Or as fast as you can say "one, two, three."

All of which has helped more than a million people who use Lotus® 1-2-3® make the switch to Microsoft Excel: the spreadsheet for Windows.™

And finally, we've not only made Microsoft Excel for Windows easier to use, we've also made it easier to get. Right now, you can easily switch for as little as $129.† Just visit your nearest reseller, or give us a call at (800) 426-9400, Department HY8.



Over a million Lotus users have already made the switch to Microsoft Excel: the spreadsheet for Windows.*

Then you can see for yourself why the most innovative spreadsheet actually feels a little like magic.

Microsoft®
Making it easier

**Each year shows approximate total number of users who have switched. Microsoft Excel 4.0 for Windows has a 90-day money-back guarantee. †Plus freight and applicable sales tax. Offer good through June 30, 1993. For information only: In Canada, call (800) 563-9048; outside the U.S. and Canada, call (206) 936-8661. Microsoft is a registered trademark and Aut*

With Microsoft Excel, making a great-looking chart has never been easier. That's because the ChartWizard tool helps you create smart-looking charts, step-by-step.

nly in the 50 United States. See reseller for details. Reseller prices may vary. © 1992 Microsoft Corporation. All rights reserved. Printed in the USA. Inside the 50 United States, call (800) 426-9400, Dept. HY8.
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Pinnacle's Integrated Document Manager

TEST DRIVE

While the paperless office remains a dream for most, Pinnacle Micro is taking a brave step in the right direction with its $6995 Paperless 1 document management system.

Paperless 1 consists of a flatbed scanner, an external optical drive, a half-length SCSI card, and all the cabling, software, and documentation you need to install the system on a PC.

Paper documents are converted to digital via a 400-dpi Pinnacle flatbed scanner. Scanned images are stored on Pinnacle's PMO-650 optical drive, the virtual file room for the P1 system. The drive uses removable 600MB disks.

We ran the Paperless 1 off a Compaq Deskpro 386/25e using a late beta version of Pinnacle's *Windows* software. Despite solid documentation and informed tech support, installation was typical for a SCSI device—difficult. Once installation was complete, the P1's module-based software proved simple to use.

We started by defining users and access privileges in P1's Administration module, creating open areas for public documents while controlling access to personal file cabinets and the like. P1's password and access options also let us customize user rights. Next we created our filing system in the Template module. Under P1's loose file-cabinet metaphor, we defined templates that associate files with search data such as origin, date, and topic. These templates would become the base of P1's retrieval and storage functions.

The flatbed scanner proved a quick, competent performer. Unfortunately, the lack of a preview option forced us to scan, view, and then rescan some documents to achieve optimal results. Documents were then filed using the associations created in our templates. Unfortunately, scanning and filing required our system's full attention, with no cancel option available to get us out without having to reboot.

Retrieving documents was relatively simple, with keyword selections invoking a list of associated documents. However, documents could be viewed only one page at a time—either close up for reading or as a full page—prohibiting the overview of an entire document. Such basic limitations make the move from paper dubious. Still, Pinnacle has created an intriguing package that takes us closer to reducing our dependence on paper.

—Michael Desmond

PINNACLE'S P1 SYSTEM includes a scanner, an optical drive, and a SCSI card.

Pinnacle Paperless 1

This document management system moves us closer to the paperless office.

Key Features: Integrated solution • Security and administration features • Unlimited storage • Simple Windows interface

Pricing: $6995

Availability: Immediate

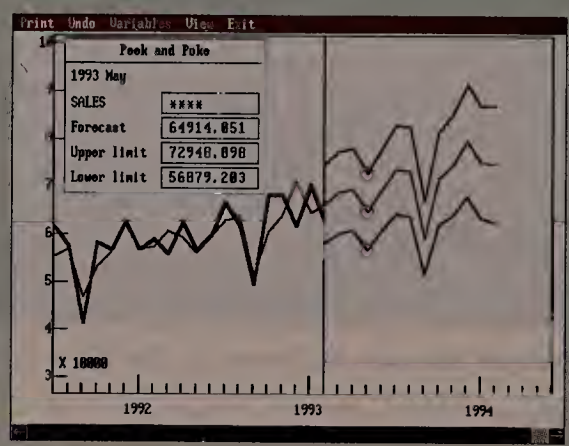
Pinnacle Micro, 800/553-7070, 714/727-1913 (fax)

Reader service no. 796

Forecast Pro 2.0 for DOS:

The latest version of the *Forecast Pro* business forecasting application gives DOS users the features their *Windows* brethren already enjoy. New to the DOS version are a revamped *Windows*-like interface, more graphing options, and a batch forecasting procedure. With *Forecast Pro*, you can see projected sales, revenue, and demand using data in ASCII and most spreadsheet file formats.

New drop-down menus, an icon tool bar for common tasks, and on-line help make navigating the DOS version easier. Options for constructing graphs include choice of line color and style. A "peek and poke" option (below) lets you drag and drop figures into graphs and forecasts; the old version made you adjust figures in the data file.



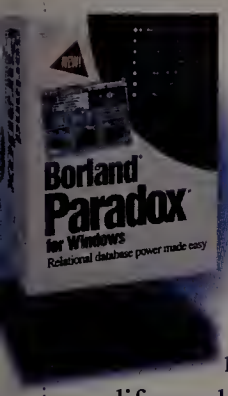
Another big time-saver, batch forecasting, can prepare 50 forecasts with one command. New what-if models in dynamic regression and exponential smoothing techniques are also provided. To prove your work to the skeptics, an improved audit trail feature shows how a forecast was created. If you spend a lot of time forecasting, this version should make your work faster and easier. The package lists for $595; upgrades are $199 until May 31. Business Forecast Systems, 617/484-5050. Reader service no. 797

JOHN GREENLEIGH

Introducing Borland's Paradox for Windows

Special Offer!

Experience the magic of easy database power



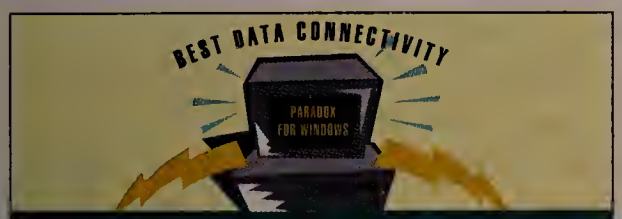
If you're looking for the easiest-to-use, most powerful, and most reliable Windows database, this is it! With new Paradox® for Windows, there's no limit to what you can do. The graphical interface makes it easy to access, modify, and present your data. Create customer lists in seconds, automatically generate reports with the push of a button, or retrieve data from different sources into a single answer table.

The best way to manage Paradox and dBASE data

Paradox for Windows makes it easy to work with your Paradox and dBASE® data. You can view, edit, query, and link to all your data, with no limitations. You make your request for data simply by checking off boxes with easy-to-use Query By Example. Then the Paradox for Windows query optimizer automatically determines the fastest way to deliver the answer.

Paradox for Windows lets you manage virtually unlimited data types, too. You can store any kind of information, including text, menus, graphics, OLE objects, sound, and even multimedia. You can even mix and match Paradox and dBASE data in queries, forms, and reports.

More people trust their data to Borland than all other database companies combined. That's why Borland is the Data Company. Put the power of Paradox to work for you today. You will be amazed at what you can do.



Paradox is the best Windows database

	Paradox	Access
Performance		
Insert 1,000 records*	29 sec	147 sec
Range selection: 15,000 of 130,000 records*	<1 sec	16 sec
Complete Paradox and dBASE file support	✔	
Visual data modeling for forms and reports	✔	
Object-oriented development environment	✔	

Special introductory offer.
Offer expires April 30, 1993.

$139.95

(regular list price $795)

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In Canada, call 1-800-461-3327.

90-DAY GUARANTEE MONEY-BACK

Borland® Paradox® for Windows

All tests run on IBM PS/2 Model 70 386/20 mhz, 4Mb RAM, Novell 3.11 NetWare, Ethernet network. Special offer good in the United States and Canada only. Prices in U.S. dollars. Copyright © 1993 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. BI 1548

Circle 44 on reader service card

Notes 3.0: A Balance Between Power and Grace

TEST DRIVE

Choosing work-group software is a dilemma. The product must be powerful and sophisticated enough to let networked groups share information, track work, and collaborate effectively. But it must also be easy to use: If individuals aren't able to manage the software, it's worthless.

The latest version of *Lotus Notes*, release 3.0, helps resolve that dilemma by providing corporate developers with powerful tools that allow them to create easier-to-use *Notes*-based applications. The company has added more capable database tools, providing support for networked Macintoshes and improving ties to *cc:Mail* and NetWare. These improvements let *Notes* developers create applications that are more intuitive, more automated, and more transparent to the user. Still, like many other work group applications, *Notes* remains too complicated for the average user to customize. This drawback limits user creativity and may prevent those who know the business best from altering *Notes*-based applications to meet the company's needs.

Notes 3.0: Power to the Work Group

Usability
- SmartIcons and status bar
- Full-text search supports QBE and Boolean operators
- Simplified install program

Database and design
- Full-text indexing
- Databases up to 1GB
- Selective copying of portions of a database

Work-flow automation
- Event-driven documents and mail posting
- Scheduled macro execution

Document management
- Restrict access to portions of document
- Safeguards originals, audit trail for versions

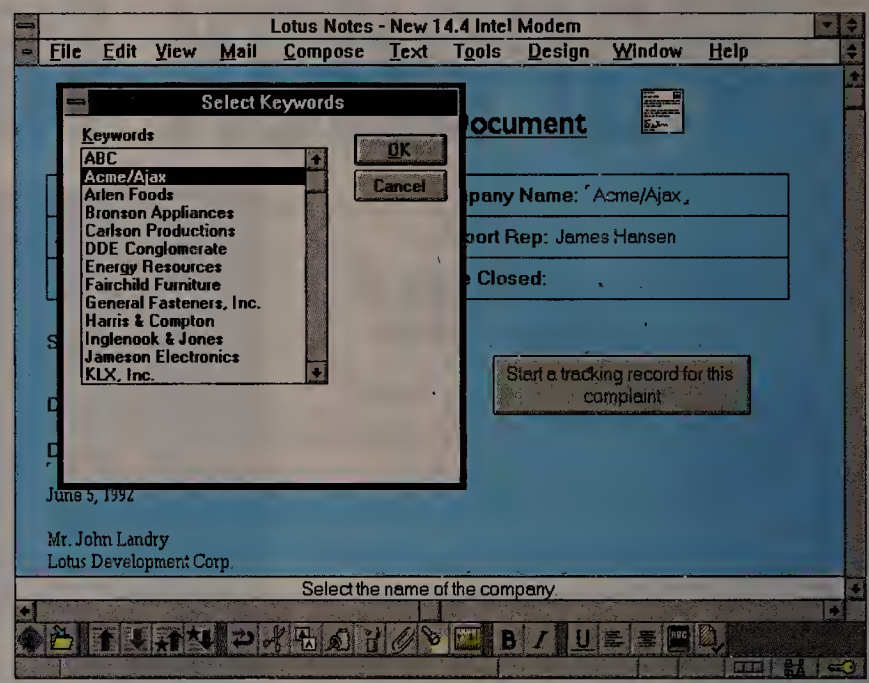
Networking
- Macintosh connectivity
- Tighter integration with cc:Mail
- Supports Novell's IPX/SPX protocol, saves up to 56K RAM
- SQL access

A Familiar Interface

Those who use other Lotus products will recognize a familiar interface. Several features from Lotus spreadsheet and word processing programs make an appearance here also. More than 100 SmartIcons provide mouse-click access to functions such as sending mail, formatting text, and displaying unread messages.

An improved search facility lets you build queries for words, phrases, and numbers using query by example, Boolean operators, and proximity operators (find a word within the same paragraph as another word). The product is now able to search across multiple databases and includes full-text indexing for faster searches of large databases.

Many improvements involve database functions. You can automate data entry with lookup features that read an input value and import or display related data from a predefined database or keyword list. But although *Notes* can retrieve data from other sources, you can't use its forms to update other databases or keyword lists, as you can with many database programs. The @Prompt command enables corporate developers to build keyword lists.



THIS LIST OF COMPANY NAMES POPPED UP when the user tabbed to a field linked to it with Notes 3.0's @DBColumn command.

Notes' work-flow-automation can track documents and route them automatically to the right people. For example, the command @MailSend allows developers to create applications that send documents or E-mail automatically when specified events occur. Say a sales manager wants to sign off on every order taken by members of the sales staff. After a salesperson completes an electronic *Notes* order form, a preprogrammed @MailSend command automatically forwards the document to the sales manager.

Document management and editing receive careful attention in *Notes 3.0*. For documents with sensitive information, the program offers password protection, which lets you prevent access to certain sections of a document by staff who must access other parts. A version manager makes it possible for users to modify a document and automatically retain a copy of the original. This feature keeps track of just who made which changes, and when.

In this latest incarnation, *Notes* manages to deliver improvements both in power and in ease of use. The product represents a definitive step forward for work group applications.

—Randy Ross

Lotus Notes 3.0

A significant upgrade for the king of work-group applications.

Key Features: SmartIcons • More powerful database features • Enhanced network support • Improved document management

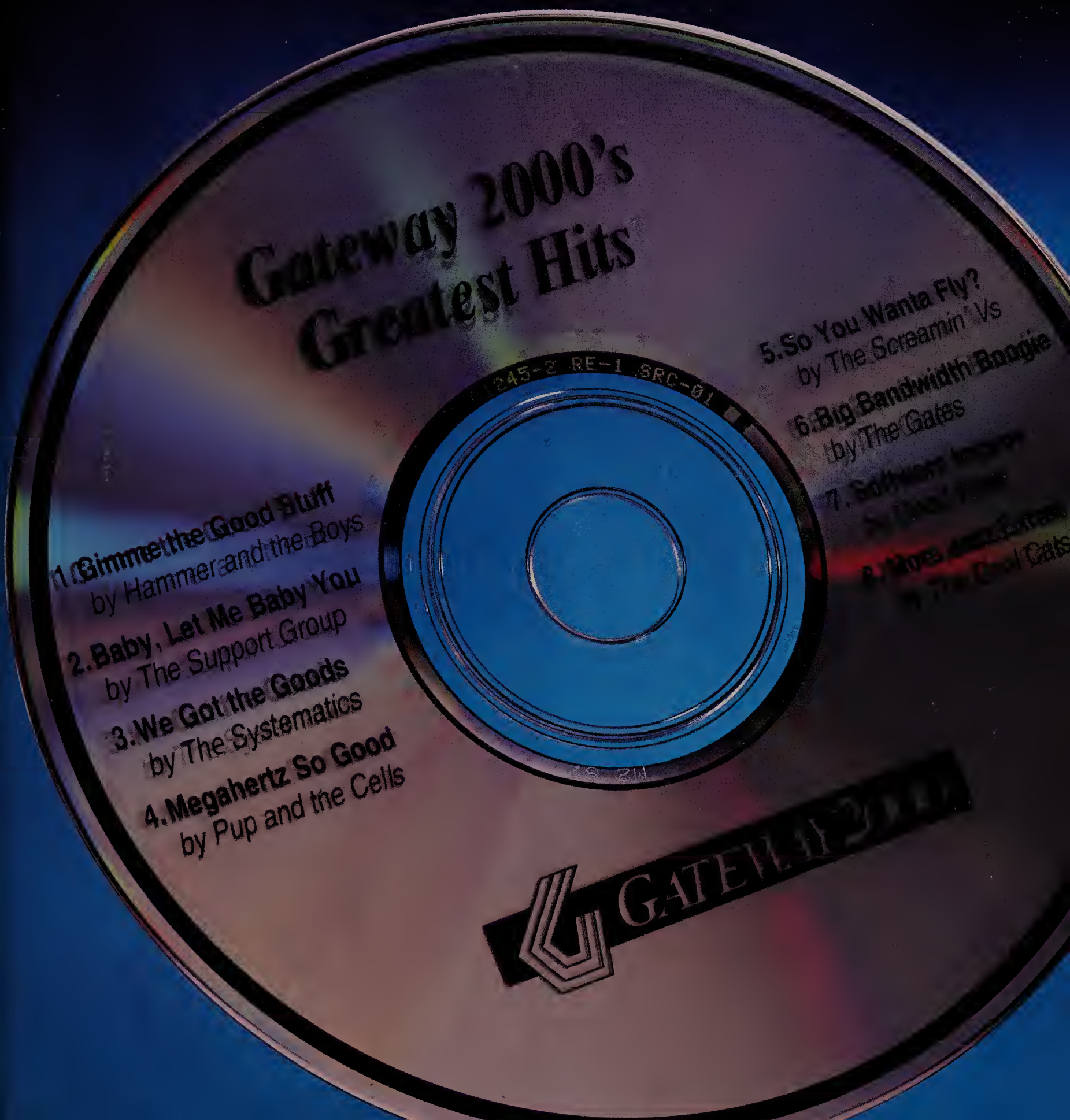
Pricing: $495 per node

Availability: April

Lotus Development Corp., 800/343-5414

Reader service no. 798

We're Playing Your Song!



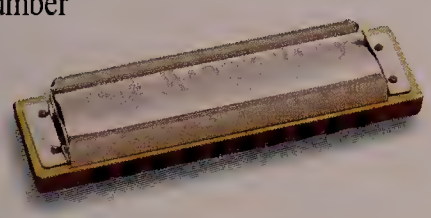
intel inside

If Gateway 2000 was a record, what would we sound like? Music to your ears!

Those Old-Time Country Values
by The Low Overheads

Our album would kick off with some great Country tunes because, after all, we're the original country PC company with the low-overhead prices. We're located

in the heartland of America where our factory is bordered by corn and bean fields. KSUX country radio, the Super Pig, is the number one station in these parts (no fooling). Gateway folks are mostly midwest born and raised, and it shows in our quality workmanship and in the friendly, down-home way we treat our customers. We'll bend over backwards to please you. When you buy from Gateway, you get the best price, quality and service. That's a value nobody can beat.



Gimme the Good Stuff –
by Hammer and the Boys

This song is dedicated to everybody who's tired of new technology becoming affordable only after it's upstaged by something better. At Gateway, we offer the latest, newfangled technology at homespun prices.

Baby, Let Me Baby You
by The Support Group

Every Gateway 2000 system comes with excellent after-the-sale support. You get a **30-day money-back guarantee**. If you don't like your system, send it back within 30 days for a refund. All systems come with a **one-year limited warranty** and telephone **technical support** for the life of the system from our award-winning tech department. We received *PC World's* World Class Award in 1992 for best service and support in the hardware category. And in a February 1993 survey, *PC Magazine* readers once again gave Gateway an excellent rating for service and reliability. You also get a **lifetime BBS membership** for additional technical support and online forums.

To serve you better, we've hired and trained over 500 new people for customer service, technical support, sales and manufacturing in the past five months, bringing our total number of employees to over 1,900.

We offer **on-site service** to most locations in the country (factory service only for notebooks). **Replacement parts** leave our factory as quickly as possible; we pay overnight shipping. Plus we now have **interactive documentation** on desktop systems with pictures and text right on your hard drive (in addition to comprehensive hardware and software manuals).

We make it easy for you to buy a Gateway PC, too, with convenient payment options including major credit cards and C.O.D. terms. Net 30-day terms and leasing options are also available to qualified commercial customers. All this *and* your great-looking Gateway PC comes in our distinctive, country cow-spotted box!

GATEWAY2000

800-846-2065

Gateway's 4SX-33 makes a mighty-fine Windows machine!

ROCK
GATEWAY2000
intel inside

We Got the Goods – *by The Systematics*

Gateway's album would continue with some heart-pounding rock 'n roll cuts because our systems are definitely pure rock. They're cool-looking, hot-performing, high-energy machines – at some sweet prices. There's a model that's perfect for you.

Megahertz So Good – *by Pup and the Cells*

Gateway's mini-desktop systems – 3SX-33, 4SX-33 and 4DX-33 – are petite but plenty powerful, based on a integrated design that incorporates many subsystems on the motherboard for the best price-performance ratio. All mini desktop systems include: 4 to 8MB RAM; a large and fast hard drive, operating on the local bus in 486 models for even faster drive performance; a fast video chipset with 1MB; a brilliant, crisp display from the standard 14-inch CrystalScan non-interlaced color monitor; and more available expansion slots than you find in most small-footprint PCs. The combination of these features makes a cool Windows machine for an unbeatable price.

According to PC World, *"(Gateway 2000's 4DX2-66V is) by far the fastest machine we've ever tested!"*

So You Wanta Fly? – *by The Screamin' Vs*

Power users, pick up the phone and order a Gateway 2000 VESA local bus 486 machine right now. You'll never regret it. With our 4DX2-50V or 4DX2-66V models, you get screaming PC performance. We put ATI's Graphics Ultra Pro video card with 1MB VRAM on our VESA local bus for results that are simply awesome! Plus these systems have a hefty 8MB RAM with cache, and hard-rockin' hard drives running on the local bus. Extra VESA local bus expansion slots, too. You get a 15-inch flat, square CrystalScan color monitor – our top-of-the-line – and more choices of cool application software than you'll find anywhere else.

We custom-build each Gateway 2000 computer to your order. We'll gladly provide you with a quote on a special configuration. Call our sales department!

Big Bandwidth Boogie – *by The Gates*

If you're looking for the 32-bit power of an EISA system, we offer three models – 4DX-33E, 4DX2-50E and 4DX2-66E. All models include: 8MB RAM with 256K cache; a very large, very fast SCSI hard drive; 32-bit EISA SCSI controller; and a standard tower case. Please call for details and prices on models not listed on our price page.

Workin' Up Some New Riffs – *by The Harmonics*

This one's our theme song. At Gateway, we're always looking for ways to make your PC easier and more fun to use. For example, we now install a Mach 32 video driver icon in your Windows control panel so you can change your video resolution quickly and easily.

All Gateway systems go through extensive compatibility testing to ensure flawless performance with all products from major software developers and peripherals manufacturers.

GATEWAY2000

800-846-2065

GATEWAY
2000
WORD
dBASE IV
Microsoft WINDOWS FOR WORKGROUPS
Microsoft WORD & BOOKSHELF
GATEWAY 2000
intel inside

Windows to the Other Side – *by Tommy Gee*

Gateway's album would also include jazz favorites because we offer a complete line of software and peripherals to make your system extra cool.

Software Improv – *by Good Vibes*

All Gateway systems come with some very hip software, all pre-installed and ready to run the moment your PC arrives. With mini desktop, desktop and tower systems that include "choice of application software," you get to pick one of the following applications, all latest versions:

- Microsoft® Excel for Windows™
- Microsoft Word for Windows™
- Microsoft Word and Bookshelf 92® CD
- Microsoft PowerPoint for Windows™
- Microsoft Project for Windows™
- The MS Entrepreneur Pack (Works,™ Publisher,™ Money,™ and games)
- Borland Paradox® for Windows™
- The Windows Programmer Pack (MS Quick C,™ Visual Basic and more)
- Upgrade to Microsoft Office™ for $175

All Gateway desktop systems also come with Cool Tools for DOS, a diagnostic and utilities package including QA Plus™ from Diagsoft, Central Point® Anti-Virus and more.

Connectivity – *by The Local Area Group*

TelePath™ Fax/Modem. A 14,400bps modem, V.32bis, with 9,600bps fax capability. Includes WinFax Pro, Crosstalk for Windows, Qmodem. $195

Network Cards. Call for a selection of Ethernet cards and Token Ring adapters, installed and configured.

Microsoft Windows™ for Workgroups. Networking made easy! Price includes an Ethernet adapter and software. Hardware and software factory-installed. $159

WOW – *by Talking Pictures in Motion*

CD-ROM Kit. Includes CD-ROM, interface card and everything you need to add MPC-compliant CD-ROM to your PC. $225

Microsoft Windows Sound System.™ Package includes sound board, microphone, headset and software. $149

Multimedia Accessories. Call for details on other multimedia hardware and software.

Accessorize – *by The Wizbangs*

We offer many other system options and upgrades, including:

- 17" and 20" Monitors
- Tape Backup Units
- Texas Instruments Laser Printers
- Panasonic Dot-Matrix Printers
- Bigger Hard Drives
- Other Software

Call today!

The software and peripherals listed here are sold only with the purchase of a system. For details on our complete line of extras for Gateway customers, call direct to our special add-on components division: ***800-846-2080.***

Gateway's 4DX-33V is shown here with Windows Sound System components, the CD-ROM kit and optional speakers. Call for details on this system.

GATEWAY2000

800-846-2065

Two Low-Priced Scanners for Document Management

FICUS Systems has shipped two low-cost 300-dpi scanners geared for document imaging and users who favor speed over image quality: They are the $795 Leoscan 610 for individuals and small work groups that generally scan less than 50 pages per day, and the higher-performance $2695 Leoscan 1210 for larger work groups and those with color needs.

Both support the popular scanner-to-software interfaces—TWAIN, and Pixel Translations' ISIS—and work with a wide range of imaging, OCR, PC fax, and forms processing programs.

The 610 measures 11.6 by 4.2 inches—smaller than a loaf of bread. A built-in automatic document feeder holds ten legal-size pages and adjusts to handle items as small as business cards. To scan, you insert documents vertically into a slot on top of the device. The product can scan images in 8-bit gray scale (256 shades of gray).

The vendor claims the product can scan 6 pages per minute at 300-dpi resolution. To accelerate scanning, the 610, like the 1210, connects via cable to an ISA bus interface card with direct memory access capabilities. This feature lets the scanner send data directly to RAM with minimal assistance from the PC's CPU. As a result, the device doesn't have to wait for the CPU to move data into RAM, freeing the CPU to pursue other tasks, such as OCR or image compression.

The 1210 is the unit for those who regularly scan a large volume of documents. This full-size flatbed machine can scan 12 pages per minute at 300 dpi, the vendor claims, twice the rate of the 610.

The 1210 can scan images in 24-bit color (16.8 million colors) or 8-bit gray scale. Its automatic document feeder holds 50 pages of legal-size paper. Other thoughtful additions include a spare scanning bulb attached inside the unit and a double-hinged flatbed cover that applies even pressure on books and periodicals when scanning.

—Randy Ross

THE LEOSCAN 610 is a compact 300-dpi scanner for individuals and small work groups with simple scanning needs.

Leoscan 610, Leoscan 1210

Two high-performance, low-price scanning options for document imaging and OCR applications.

FICUS Systems Inc.
617/938-7055,
617/938-7054 (fax)
List price: Leoscan 610 $795, Leoscan 1210 $2695
Reader service no. 770

Two Vendors Smooth the Path to SCSI

SCSI holds extraordinary promise: One card, the host adapter, can serve as the conductor for a symphony of peripherals. But the reality of installing SCSI and adding new devices can be one of computing's more frustrating challenges.

No longer. Adaptec and Future Domain promise to make the move to SCSI relatively painless.

Adaptec's AHA-1540C SCSI host adapter makes installing SCSI a breeze: There are no jumpers and no guessing which SCSI ID numbers are available when you install a device. Everything is software driven except the act of placing the board in a slot.

Included with the board in Adaptec's $367 SCSI Master Kit is *EZ-SCSI*, which jumps through the installation hoops for you, picking the adapter's port address, assigning device ID numbers, and selecting and installing device drivers.

The AHA-1540C speeds you on your way after installation, too, offering throughput roughly 20 to 25 percent faster than its predecessors. The adapter boasts a 5-megabyte-per-second synchronous data transfer rate, 2MBps for asynchronous.

Host adapters and peripherals generally use one of two SCSI interface languages—Adaptec's Advanced SCSI Programming Interface (ASPI) or ANSI's Common-Access Method (CAM). With *SCSIworks* software, Future Domain lets users attach ASPI or CAM devices.

SCSIworks improves performance and eases SCSI installation. It comes with all Future Domain host adapters and is available free on Future Domain's BBS. The software runs only on Future Domain or Corel SCSI host adapters. A disk version costs $25.

—Richard Melville

Adaptec SCSI Host Adapter

This new host adapter challenges the notion that SCSI has to be painful.

Adaptec
800/934-2766,
408/945-8600
List price: AHA-1540C $289, AHA-1542C (with floppy controller) $299, EZ-SCSI $75; SCSI kits with card and software also available
Reader service no. 771

Future Domain SCSIworks

The first step toward universal SCSI compatibility.

Future Domain
714/253-0400,
714/253-0432 (2400-bps BBS)
List price: free via BBS, disk version $25
Reader service no. 772

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January 1993

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November 10, 1992

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Best spreadsheet. Best price.

See your dealer or call now, 1-800-336-6464, ext. 6508

In Canada, call 1-800-461-3327.

Borland
Power made easy

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Circle 13 on reader service card

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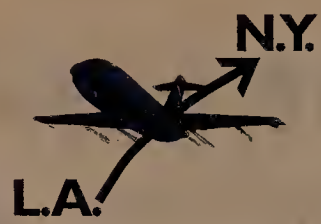
- 80MB (19ms) HARD DRIVE
- VGA COLOR LCD (9", 640 x 480)
- 7.1 LBS. (INCLUDING BATTERY)
- 8.5" x 11" x 2.3"
- NiMH BATTERY
- 3-HOUR BATTERY LIFE, UP TO 5 HOURS WITH POWER MANAGEMENT ENABLED
- MS-DOS® 5.0

260,000 colors.
At your disposal is every color of the palette, and then some. If Van Gogh had one of these, maybe he wouldn't have been so uptight...



Long battery life.
The good news is the battery can hold out flying all the way from L.A. to N.Y. The bad news is, who wants to work all the way from L.A. to N.Y.?

Greater upgradeability.
Along with the special Intel chip made specifically for notebooks, there's also room for a modem, coprocessor, 200MB hard drive and up to 12MB of RAM.

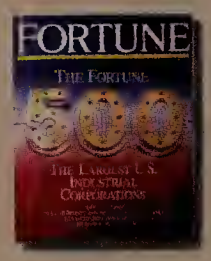
THE DELL 325N
386 SL 25MHz
NOTEBOOK

NOW $1,849

- LEASE: $68/MO.
- 4MB RAM
- 80MB (19ms) HARD DRIVE
- EDGELIT VGA LCD (9.5", 640 x 480)
- 6.4 LBS. (INCLUDING BATTERY)
- 8.5" x 11" x 2.1"
- NiMH BATTERY
- 3-HOUR BATTERY LIFE, UP TO 5 HOURS WITH POWER MANAGEMENT ENABLED
- MS-DOS 5.0

Guaranteed Response.
We guarantee that when you call us, you'll talk to a technical specialist within five minutes or less. And that in the unlikely event you have compatibility problems, we'll help you solve them.[*]

Large storage capacity-200MB drive available.
With all its storage, this little notebook makes the Astrodome seem positively cramped.



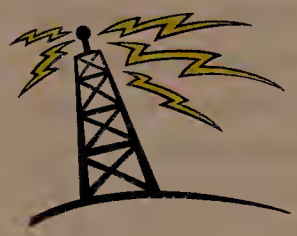
Two-thirds of the FORTUNE 500® are Dell customers.
By the way, those FORTUNE 500 customers are the ones who vote us number one in customer satisfaction surveys.

THE DELL 320SLi
i386 SL 20MHz 3.6 LB.
NOTEBOOK

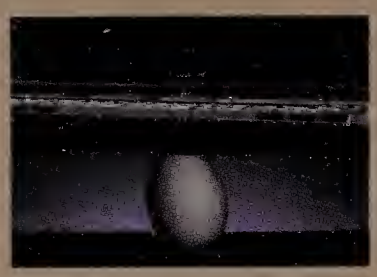
NOW $1,699

- LEASE: $63/MO.
- 2MB RAM
- 60MB (19ms) HARD DRIVE
- REFLECTIVE VGA LCD (9.5", 640 X 480)
- 3.6 LBS. (INCLUDING BATTERY)
- 7.75" x 11" x 1.25"
- NiMH BATTERY
- 3-HOUR BATTERY LIFE, UP TO 4 HOURS WITH POWER MANAGEMENT ENABLED
- MS-DOS 5.0
- MICROSOFT® WINDOWS™ 3.1
- LOTUS® ORGANIZER

Only 1.25" thick.
We call it a notebook, but it's actually smaller. Punch a few holes in it and you could carry it in a 3-ring binder.



Stay in touch.
It has an industry-standard PCMCIA type 2 expansion slot for modems and network cards. It's like taking your office with you. Only without the secretaries and coffee machines.



3.6 pounds.
At a mere 3.6 pounds, it offers features and functions usually reserved for systems twice its weight.

THE DELL DIMENSION™
NL25[†] i386 SL 25MHz
NOTEBOOK

NOW $1,599

- LEASE: $59/MO.
- 2MB RAM
- 80MB (19ms) HARD DRIVE
- EDGELIT VGA LCD (9.5", 640 x 480)
- 6.3 LBS. (INCLUDING BATTERY)
- 8.3" x 11" x 1.8"
- NiCAD BATTERY
- 2.5-HOUR BATTERY LIFE, UP TO 3.5 HOURS WITH POWER MANAGEMENT ENABLED
- MS-DOS 5.0

9.5" screen.
Ever want to see your work up on the big screen? All it takes is a small-screen budget.

Full keyboard.
Your hands don't get smaller just because your computer does. So Dell gave it a full-size, full-travel, 85-key keyboard, including special screen navigation keys in the familiar inverted-T layout.

ALSO AVAILABLE:
THE DELL DIMENSION
NL20[†] i386 SL 20MHz
NOTEBOOK

$1,399

- LEASE: $52/MO.
- 2MB RAM
- 60MB (19ms) HARD DRIVE
- EDGELIT VGA LCD (8.5", 640 x 480)
- 6.3 LBS. (INCLUDING BATTERY)
- 8.3" x 11" x 1.8"
- NiCAD BATTERY
- 2.5-HOUR BATTERY LIFE, UP TO 3.5 HOURS WITH POWER MANAGEMENT ENABLED
- MS-DOS 5.0

Performance Series systems purchased after 7/1/92. For a complete copy, please call our TechFax℠ line at 1-800-950-1329 or write Dell USA L.P., 9505 Arboretum Blvd., Austin TX
factory service only for NL20 and NL25 notebooks. [◊]Leasing arranged by Leasing Group, Inc. [*]On-site service provided by BancTec Service Corporation. On-site service may not be available in certain remote
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The Holistic Approach to PC Diagnoses

No matter how well you eat, how much you sleep, and how warm you keep, wintertime means catching at least one cold. No need for a doctor; you know it's just a cold, so an over-the-counter remedy will do.

The same goes for your computer. No matter how well you treat it, eventually something's going to go wrong. So when new and improved versions of two of the most popular diagnostic packages—*QAPlus* and *CheckIt Pro*—become available, it's time to restock the PC medicine chest.

QAPlus adds features to its diagnostic menu of system and processor and peripheral performance benchmarking. Novice PC users will appreciate the menu-driven interface and everyone will benefit from the software's capability to recognize and test the newest technology, including the Intel 386SL, 486SL, and 486SX as well as Cyrix 486 processors. The software will locate faulty RAM chips, recognize 2.88MB floppy drives, and test such recent entries as CD ROM drives and serial port data transfer rates up to 38,400 bps. Also included is Symantec's *NOVI Scan* virus detector. *QAPlus* lists for $159.95; upgrades cost $49.95.

New technologies are also at the core of TouchStone Software's *CheckIt Pro: SysInfo* and *CheckIt Pro: Tests and Tools*. The two packages, which represent a combined upgrade to *CheckIt 3.0*, offer a complete array of diagnostics for the latest systems. *SysInfo* includes performance testing for systems equipped with VESA video boards, CD ROM drives, or sound cards; indicates each device's name, driver name, and version; and in the case of the sound card, lists which devices the card is compatible with.

Tests and Tools contains a full complement of hardware and debugging tools that can be used to determine why a PC is malfunctioning.

CheckIt Pro: SysInfo costs $99.95. *CheckIt Pro: Tests and Tools*, which is bundled with *SysInfo*, costs $149.95. *CheckIt 3.0* owners can upgrade to *SysInfo* for $29.95 or the *Tests and Tools* bundle for $49.95.

—Richard Melville

QAPlus 4.7

Powerful diagnostic help.

DiagSoft, Inc.
408/438-8247
List price: $159.95, upgrade $49.95
Reader service no. 774

CheckIt Pro

A popular PC diagnostic enters the next generation.

TouchStone Software
800/531-0450,
714/969-7746
List price: SysInfo $99.95, upgrade $29.95; Tests and Tools $149.95, upgrade $49.95
Reader service no. 775

WinMaster Adds Some New Tools

PC-Kwik's *WinMaster* is a powerful set of *Windows* utilities that helps you display system information, launch programs, and keep your disks optimized for best performance. Version 1.5 adds a variety of enhancements, including improved performance, password protection, and enhanced drag-and-drop capabilities.

WinMaster's toolbox, a versatile way to organize and launch your *Windows* programs, lets you create different toolboxes or collections of icons. Version 1.5 lets you drag and drop icons between toolboxes to personalize your desktop. Also, the program's launching capabilities are impressive. You can drag a file from File Manager and drop it on the icon of the program you wish to run.

One of the best features of *WinMaster* is KwikVault, a tool for compressing and archiving files in *PKZIP* format. KwikVault now includes password protection to protect your zipped files from prying eyes. You can restore files, too, and return them to their original disk drive and directory or extract files, which keeps a copy of compressed files.

WinMaster's File Find utility is several times faster at sniffing out files, according to the company, and includes the program's KwikInfo icons, which display the percentage of CPU time and RAM and other system resources being used. Click on a KwikInfo icon, and *WinMaster* displays this resource information in chart format.

WinMaster also displays information on your hard disk's fragmentation and includes defragmenting tools. The program's Power Scope utility also shows details of disk use.

—Jeff Bertolucci

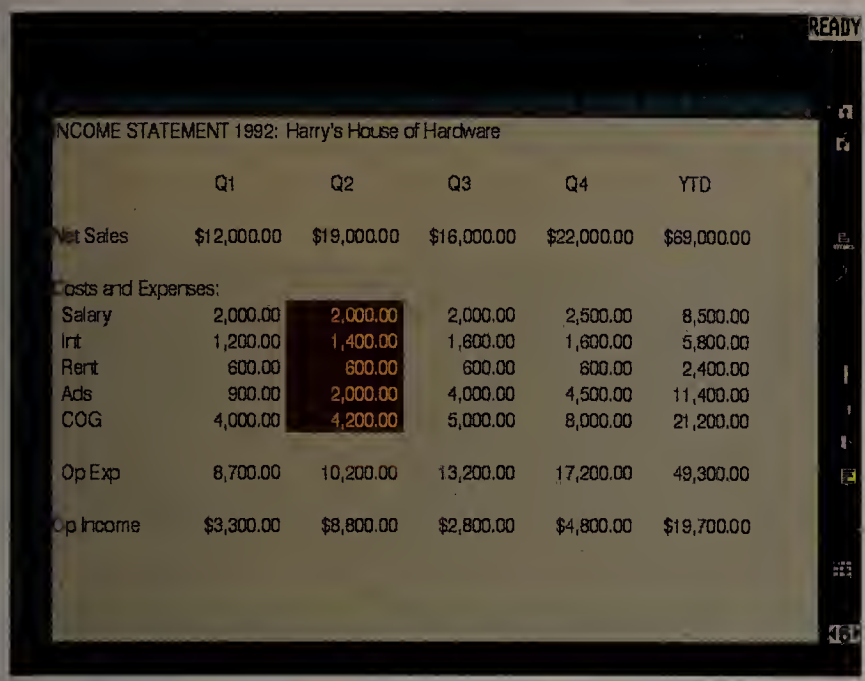
WinMaster 1.5

WINDOWS An enhanced version of PC-Kwik's set of Windows utilities.

PC-Kwik Corp.
503/644-5644,
503/646-8267 (fax)
List price: $129
Reader service no. 776

PC-KWIK'S WINMASTER 1.5 includes password protection, enhanced drag-and-drop features, faster performance, and a disk optimizer.

1-2-3 Release 3.4: Greater Than the Sum of Its Parts



NOT ONLY IS 1-2-3 3.4 FASTER and easier to install, it lets you select data with a mouse and use the <Delete> key to erase a cell or range.

A host of little improvements by Lotus in *1-2-3 3.4* add up to a major enhancement. The program is now a little faster than release 3.1+ and has a few more features, and its operation is a bit more streamlined. Sum these changes, and you'll find *1-2-3 3.4* easier to use and more efficient than its predecessor.

Many of the improvements in the $595 *3.4* are designed to save aggravation and keystrokes. For starters, a simplified installation program lets you install *3.4*, selected add-ins, and utilities all at once—*3.1+* had three installation programs. The new setup program also lists the amount of disk space each add-in or utility requires and shows how much space is available.

Compatibility Cleanup

Lotus has also simplified some of the compatibility requirements that hampered *3.1+*. In particular, *3.4* doesn't require special command line switches or other configuration tweaks to work with DOS 5.0 or with systems powered by Intel's 486SX or IBM's SLC chips. Moreover, an improved memory management system should allow users to run *3.4* under *Windows* with minimal aggravation.

Other enhancements borrow from *2.4*, the first release to incorporate SmartIcons. Release 3.4 includes 90 SmartIcons, which, with a mouse click, execute common spreadsheet commands, such as printing, graphing, adding a range of numbers, formatting numbers, and boldfacing, italicizing, and centering text. An icon editor, not available in *2.4*, lets you attach macros to your own icon creations. Other simple but invaluable features let you select data with a mouse and use the <Delete> key to erase the contents of a cell or range.

SmartIcons aren't the only improvement designed to speed you through your work. The Settings Sheet now shows the current setting for options associated with certain tasks, such as printing or graphing.

An improved debugging feature, also borrowed from *2.4*, helps you locate glitches in your macros. When you run a macro in Step mode, the program displays each instruction on the bottom of the screen as it's executed. Previously, when a macro choked on some code, the product displayed an error message and left you to scroll across the screen to the macro, where you then had to hunt through the instructions for the error.

More Power to You

Lotus claims *3.4* is about 25 percent faster than its predecessor. You'll experience improvements when loading the program, loading large files, paging up or down, recalculating, and printing. Users with 286 and older 386SX systems will notice the speedup the most.

Lotus continues to improve the spreadsheet's charting capabilities. New features let you create 3-D line, bar, pie, and area graphs; add drop shadows to bars on a graph; and place a table of data underneath a chart.

Tweaks to the Backsolver allow it to support simultaneous changes to multiple variables, which provides a quicker, more efficient way to test what-if hypotheses. The Backsolver in *3.1+* lets you adjust only a single variable.

An updated DataLens, which lets you read and write to external databases, includes drivers for *dBASE III*, *dBASE IV*, and *SQL Server* and also an improved driver for *Paradox*. Release 3.1+ lets you read and write to *Paradox* and read, but not write to, *dBASE III*. Finally, the product adds more printer drivers for popular devices and can support landscape printing on dot matrix printers.

—Randy Ross

1-2-3 Release 3.4
When you do the math, the many small enhancements to this DOS product add up to improved usability and speed.

Lotus Development Corp.
800/343-5414
List price: $595, upgrade for existing 1-2-3 and Quattro Pro users $150
Reader service no. 773

XTree Becomes a Shell

XTree is turning its *Windows* file manager into a full shell with program launching and macros. *XTree for Windows 1.5* lets you create floating button bars with programs, associated files, or macros attached to the buttons. Thanks to a special arrow, a bar can hold more buttons than will fit in the space allotted for it. With this change, the $99 package becomes a Program Manager replacement and works as a *Windows* shell. The file manager has *Windows 3.1* drag-and-drop support, and you can print from the file viewers.

—Lincoln Spector

XTree for Windows 1.5
WINDOWS Now a shell with macros.

XTree Co.
800/395-8733
List price: $99; upgrade for XTree/W users $19.95, for XTree users $59.95
Reader service no. 698

THE KITCHEN SINK I

If you're getting the feeling the T4500 series represents a new standard in business notebook computing, you're right.

Our T4500C features an LCD TFT active matrix color screen that can display a kaleidoscope of 256 simultaneous colors from a palette of 185,193. Our T4500 offers a large, bright, easy-to-read 9.5" VGA display with 640 x 480 resolution and 17:1 contrast ratio.

A 150-pin expansion port lets you attach a SCSI adapter to the notebook. Or lets you attach the notebook to our Desk Station IV, providing true desktop capabilities in your office.

System control hotkeys save time by allowing you to quickly change your display setting, power management, security status, etc., without having to call up menus.

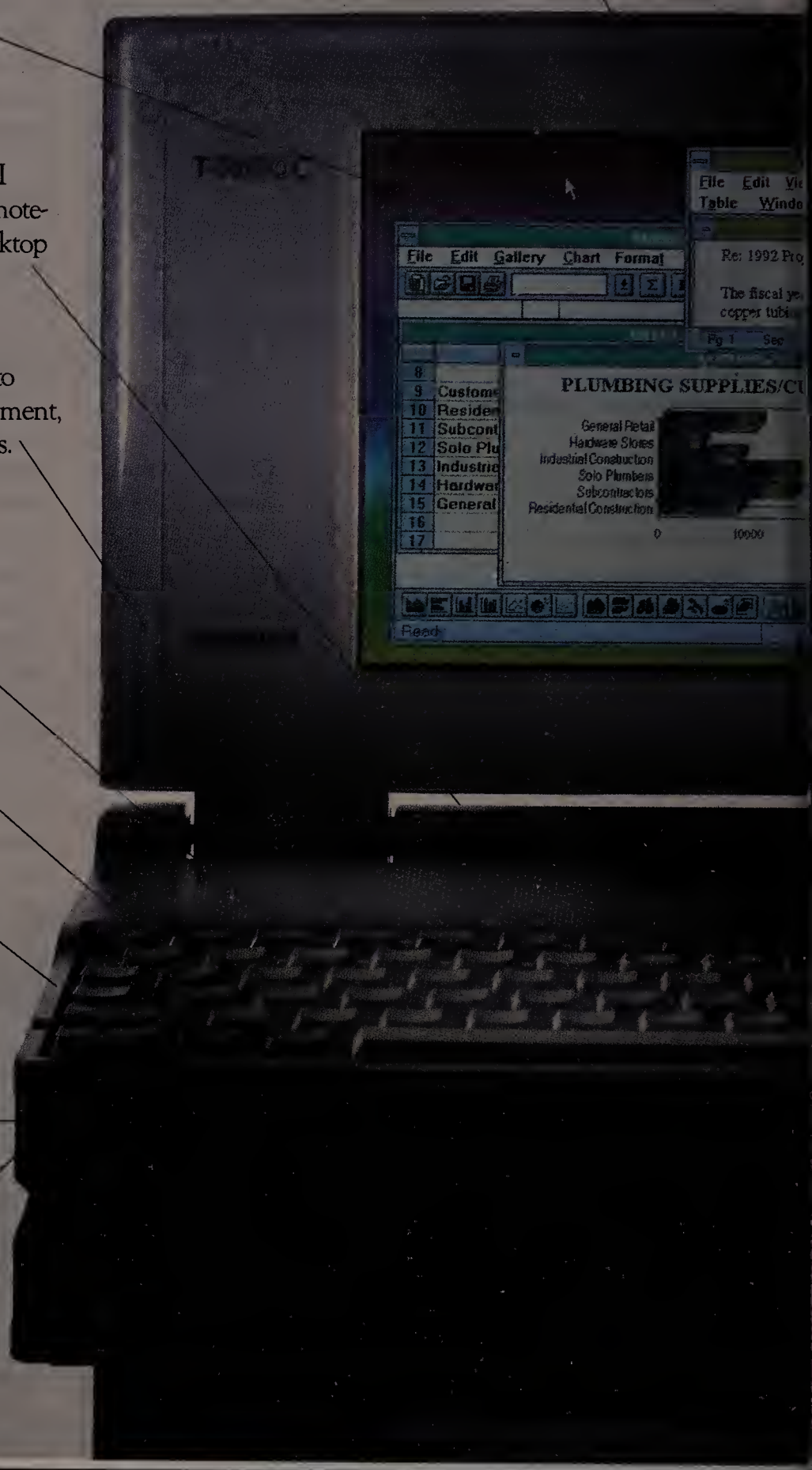
A generous 4MB RAM standard, expandable to 20MB.

Our award-winning keyboard features standard-sized keys and key spacing.

The T4500 series' advanced 20MHz i486™SX processor makes any 386 seem like a tortoise. In fact, tests reveal it's up to two and a half times faster than many 386-based notebooks.

The T4500C comes with a 120MB hard drive and our T4500 comes with a choice of an 80MB or 120MB hard drive.

3.3-volt chip technology decreases power drain by as much as 25%, while adding up to 27% more battery life.



INTRODUCING THE

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PTIONAL.

he T4500C's dimensions: 11.7"W x 8.3"D x 2.0"H.
he T4500's dimensions: 11.7"W x 8.3"D x 1.8"H.
oth fit into half of a briefcase.

Windows® 3.1 and DOS® 5.0 with Ultrafont™ come pre-installed.

AutoResume lets you start where you left off without rebooting and automatically saves your material when you turn the power off.

Our Quick Charge capabilities allow you to charge the battery while you're working.

Featuring AutoResume, AutoSave, Advanced Power Management, and CPU Sleep Mode, our MaxTime™ power management system helps you get the maximum out of every battery charge.

Quickread LCD status icons allow you to check a host of functions (including remaining battery time, keyboard status, and power-saving mode) at a glance.

An industry-standard PCMCIA 2.0 slot accepts removable hard drives, data/fax modems, network adapters, and other expansion options.

The BallPoint™ mouse connects directly to the computer through a unique "one touch" QuickPort,™ so there's no cord to get in your way.

A front-loading floppy drive provides easy access.

Both the T4500 and the T4500C weigh in at about 6.5 lbs.

TOSHIBA T4500 SERIES

The T4500 features a large, easy-to-read 9.5" monochrome screen.

Tests reveal that the 3.3-volt 20MHz i486™SX processor is up to two and a half times faster than many 386-based notebooks.

You can call real-live Toshiba technicians toll-free for complete product support.

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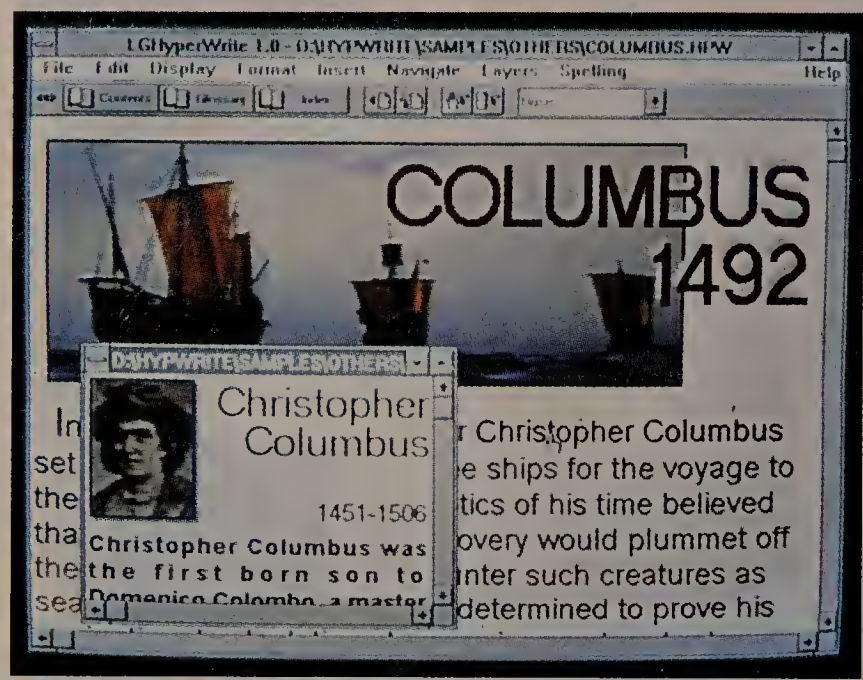
In Touch with Tomorrow
TOSHIBA
1-800-457-7777

manufacturers.

Circle 257 on reader service card

Build and View Hypertext Documents in Windows



IN A HYPERWRITE DOCUMENT, clicking on a hypertext link automatically brings up the text or graphics file you've associated with it.

Navigating through huge text files is no scroll through the park. If you're designing on-line manuals or other complex documents, you need a way for people to jump quickly from one part to another—and that means hypertext. Now Looking Glass Software has a *Windows* word processor that lets you build and view hypertext documents for a scant $149.

Looking Glass HyperWrite makes creating hypertext links smooth and easy. Simply highlight a word or phrase in your document, select *Navigate• Associate*, and choose the file you want to link to. Set a few basic parameters and you're through. You can assign colors, shadows, and backgrounds to make your hypertext links stand out, and you can save your settings as defaults. To view your work, switch to presentation mode and click once on the linked text—the associated file pops up.

But *HyperWrite* connects more than just text. You can link to and from bit-mapped graphics and WAV and other sound files. You can even link to files created by other *Windows* applications and launch them inside *HyperWrite*.

HyperWrite's Layers feature lets you apply different levels of formatting and associations to the same document. For example, say people in your office need to review and annotate a file. With *HyperWrite*, users can highlight phrases and add comments in a separate layer, leaving the content or format of the original document unaffected.

As a word processor, *HyperWrite* offers surprising power and annoying quirks. *WinWord*-like icon tool bars give quick access to file and formatting commands, plus cool tools like buttons for selecting all your text at once and creating subscript and superscript characters. On the downside, you can open only one file at a time, import options are limited, and you can't set user preferences.

—Daniel Tynan

Looking Glass HyperWrite 1.0
WINDOWS An easy, low-cost way to build hypertext Windows documents.

Looking Glass Software
310/348-8240,
310/348-9786 (fax)
List price: $149
Reader service no. 777

See a Picasso in Windows With Fractal Design Painter

If you admire the unique real-media painting skills of *Fractal Design Painter* but can't rationalize the purchase, take a look at version 2.0. Many practical new features make it not only a unique artist's tool, but also a useful image editor for business.

With built-in scanner support, four color separations, text (TrueType and Adobe Type 1), and common photo editing tools such as resize, sharpen, motion blur, distort, and flip, *Painter* has become a full-fledged image editor. It lets you enlarge an image for editing pixel by pixel. And not only will it mask an area by selecting its color, but once you've created a mask it will let you save it to a library. When you work on the image again, you don't need to recreate the mask.

Fractal Design hasn't abandoned *Painter*'s unique roots as a real-media paint program. In fact, it has new capabilities that make it even more fun. The new version has Cubist and Impressionist tools that can be applied to entire images. You can make a scanned photo look like a Picasso.

A concept introduced in this version is called liquid media. More than nine new brushes fall into this category: Frosted glass, patterned glass, watercolor with diffusion, and marbling are among them. These are great for making slide backgrounds.

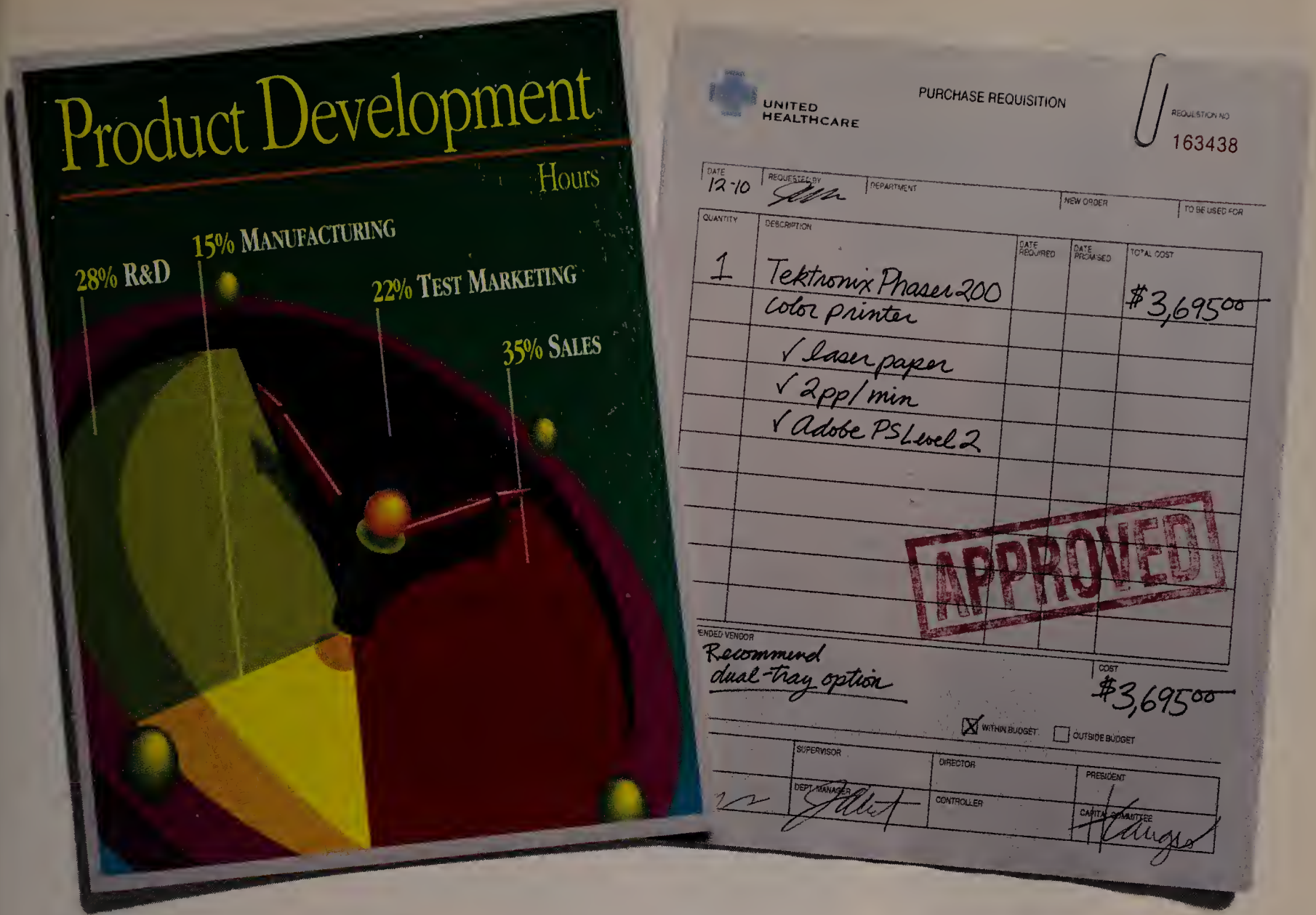
Painter 2.0 is also easier to use. You can tear individual tools (and all their attributes) off from the main tool palette and put them anywhere on screen. This makes it easier to access tools and saves screen space. And if you're unfamiliar with an effect, the new preview windows available in most dialog boxes let you see what the result will be before you apply it.

So don't worry that this program is just for fun. Now that it can do serious imaging work in a unique way, you can justify its purchase to anyone.

—Christina Wood

Fractal Design Painter 2.0
WINDOWS A great paint program gets even better with the addition of more than 70 features.

Fractal Design Corp.
408/688-5300,
408/688-8836 (fax)
List price: $399, free for users who purchased Painter after November 1, 1992 (other upgrades $79)
Reader service no. 778



Our new color printer not only looks great on paper, it looks great on paper.

True, the brilliant color produced by the new Tektronix Phaser® 200 is captivating. But the price is equally attractive. And though we've become the award-winning leader in color printers by frequently outdoing the competition, this time we've even outdone ourselves. Introducing our newest business work group color printer.

The eye when it sees black and white.

The eye when it sees color.

The Phaser 200 is compatible with virtually any business software and can print two colorful pages per minute. No, not two minutes per page—two pages per minute. And even at a speed like that, it still manages to print eye-catching color on common laser paper or transparencies using a separate input tray for each. You select the medium you want at your computer keyboard. And it switches automatically from user to user just as easily, using its parallel, serial, AppleTalk,™ or optional EtherTalk™ and Ethernet™ ports.

It has all the advantages of a laser printer. True Adobe PostScript™ Level 2, networkability, Pantone® colors, speed and price. (Did you notice it's only $3695, slightly below unheard of?) And when you add to that extremely high materials capacity and sparkling TekColor™ output—not just any color, but the indisputably best color in the business—you've got something even better than our previous best. Which is quite a feat.

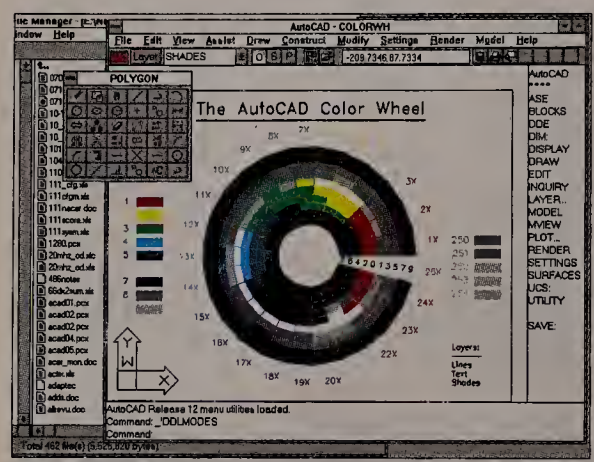
So stop by your nearest Tektronix dealer or call us at 800/835-6100, Dept. 281 for a free output sample. For faxed information call 503/682-7450, ask for document # 1223. You won't find another business investment that looks this good on paper.

Tektronix

Phaser is a trademark of Tektronix, Inc. PostScript is a trademark of Adobe Systems, Inc. All other marks are trademarks or registered trademarks of their respective companies.

Circle 124 on reader service card

AutoCAD Draws on Windows for More Power and Features



AUTOCAD COMES TO WINDOWS with drop-down menus and a floating icon toolbox.

With *AutoCAD release 12 for Windows*, the most popular computer-aided design (CAD) package just got more powerful. *AutoCAD for Windows* has the same look and feel as release 12 of *AutoCAD* for DOS, making the switch to *Windows* virtually painless.

In addition to the drop-down menus found in *AutoCAD* release 12, there's a tool bar for instant access to commonly used commands, like ortho, snap, and zoom. A floating toolbox contains icons for 36 popular drawing and editing tools. And with comprehensive, context-sensitive help a mouse click away, the reference manual probably won't budge from its shelf.

AutoCAD for Windows runs up to three *AutoCAD* sessions simultaneously. Using *Windows'* Clipboard, you can move graphics and text from one drawing to another, or between *AutoCAD* and other *Windows* applications.

AutoCAD also makes use of *Windows'* Object Linking and Embedding (OLE) and Dynamic Data Exchange (DDE) functions. With OLE, *AutoCAD* objects can be linked from one drawing to another, so changes made to the original object are automatically reflected in the linked drawings. DDE links let developers create applications where changes in an *AutoCAD* drawing can be viewed on a spreadsheet as a new bill of materials or updated cost analysis.

AutoCAD for Windows lists for $3750—the same as the DOS version. You'll need a minimum 8MB of RAM (plus 4.5MB for each additional concurrent *AutoCAD* session) and 26MB of free disk space. The speed is slower than its DOS counterpart's, but for real power users, it's a small price to pay.

—TJ Byers

(section continues on page 83) ▶

AutoCAD Release 12 for Windows

WINDOWS Data exchange between AutoCAD drawings and Windows applications adds muscle to CAD.

AutoDesk, Inc.
800/964-6432
List price: $3750
Reader service no. 779

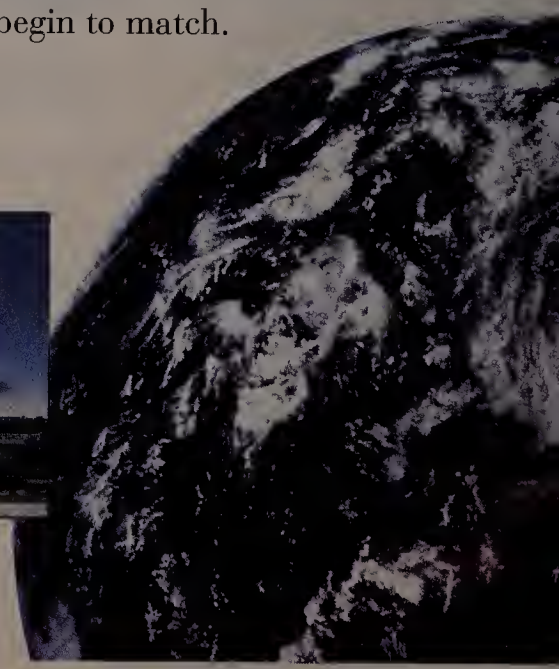
The Perfect Back-up For An Imperfect World.

Accidents don't happen in perfect worlds. In *this* world, the best solution is VALITEK.

VALITEK builds every tape back-up drive as though your business depends on it. There's no safer, simpler, smarter tape back-up drive anywhere. No installation. No controller cards. No pre-formatting tapes. Back-up from 60 MB to 1.2 GB with speed and reliability no bargain basement tape drive can begin to match.

Complete portability. Rock-solid construction. Uncompromising quality.

When you can't afford to lose a single bit of data, can you afford anything less than VALITEK?



VALITEK

100 University Drive, Amherst, MA 01002
CALL: 1-800-VALITEK or 413-549-2700
FAX: 413-549-2900 BBS: 413-549-7560

The worldwide leader in parallel/serial technology

Circle 224 on reader service card

We've Got A Portable Solu

Who says notebook PCs are only for serious globetrotters? They're also cool for people who only travel from home to office. Or how about corporate cats who travel from conference room to conference room for those perpetual meetings? Or sales people who could dig a computer at their client's location? Really, most people would enjoy the convenience of the right portable. But who can afford both a portable and a desktop PC? *You* can! Gateway 2000 has the portable solution that's in tune with you!

Nomad Combo: One Computer System with Portable and Desktop Functionality for One Low Price!

With a Nomad Combo from Gateway, you don't have to buy two PCs. You get a very powerful notebook computer, one of Gateway 2000's top-of-the-charts Nomad models, with a 15-inch CrystalScan high-resolution color monitor and our custom 124-key AnyKey keyboard. You can use the Nomad by itself in portable situations. At just 5.6 pounds, with a bright, backlit screen, comfortable keyboard, great battery life and 486 performance, it's all you could ever want in a notebook. In your office, the Nomad functions as your desktop. Just plug it in to the desktop monitor and keyboard, and you have a 486 office PC. It's easy to tie into your company's network, too, with Ethernet and Token Ring options available. Gateway Nomads are powerful, expandable and affordable.

One computer. Two functions. One low price. Can you dig it?

tion That's In Tune With You!

HandBook Combo: Two Computer Systems, in Tune with Each Other, for One Low Price!

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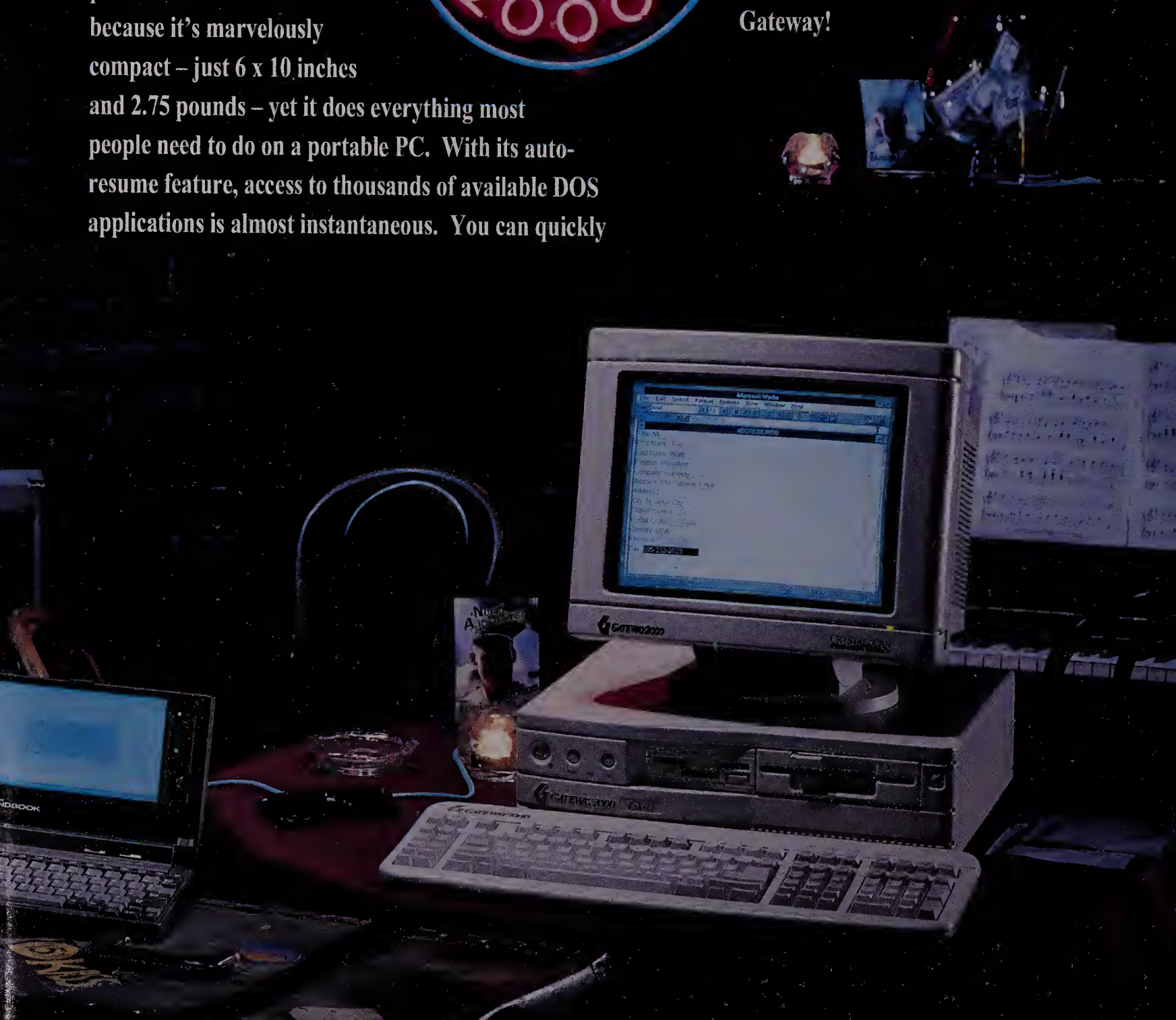

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- 4.5-Hr. Battery & AC Pack
- MS-DOS,® InterLink,® MS Works™ for DOS

And 4DX-33 Mini Desktop*
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- Windows Accelerated Video w/ 1MB
- 14" Color CrystalScan 1024NI
- 124-Key AnyKey Keyboard, MS Mouse
- MS-DOS, Windows & MS Works for Windows

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- 6-Hr. NiCad Battery & AC Pack
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- 1 Parallel/1 Serial Port
- 79-Key Keyboard & FieldMouse™
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- MS Works for Windows 2.0

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- 79-Key Keyboard & FieldMouse
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$2495

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- 6-Hr. NiCad Battery & AC Pack
- 1 Parallel/1 Serial Port
- 79-Key Keyboard & FieldMouse
- MS-DOS 5.0 and Windows 3.1
- MS Works for Windows 2.0

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NOMAD 425SXL COMBO

- Nomad 425SXL*
- 15" Color CrystalScan 1572FS
- 124-Key AnyKey Keyboard
- Microsoft Mouse

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NOMAD 425DXL COMBO

- Nomad 425DXL*
- 15" Color CrystalScan 1572FS
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- 124-Key AnyKey Keyboard
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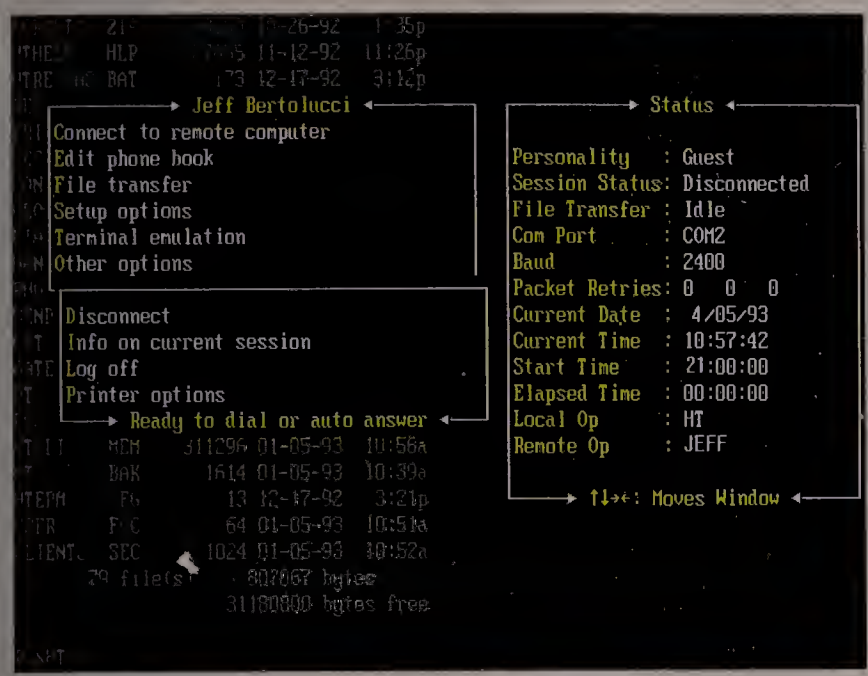
Here & There Offers Remote Access



HERE & THERE lets you send and receive files simultaneously.

Remote-control utilities that let you control your office PC from your home PC or notebook aren't new, but Fifth Generation Systems' $149 *Here & There* brings some fresh touches to the genre, including a clear menu-driven design that simplifies two-way remote control, the capability to remotely access network drives, and a way to perform background file transfers while running other DOS applications.

The program requires 65K of RAM, but you can avoid RAM cram by installing only the software modules you're likely to use; for example, remote printing requires 3K of RAM, mouse support needs 2K, and so on.

A hot-key combination loads *Here & There*. Then you're greeted by a simple menu selection, including choices for connecting to a remote PC, editing your list of remote PCs, transferring a file, terminal emulation, and other options.

As with any remote package, *Here & There* gives the remote user complete control over the host PC. You can run DOS programs remotely—and even run *Windows* programs from the host, provided you have a copy of *Windows* installed on the remote PC. Graphical environments such as *Windows* typically require lengthy screen redraws, so a high-speed modem (9600 or 14,400 bps) at both ends will save time and money.

Here & There provides a number of helpful features that make your remote session more productive. You can transfer files between PCs while running other DOS applications and redirect printer output.

Here & There lets you access your office LAN so you can, for instance, pull database or spreadsheet files off a network drive or use the network printer. Also, you can use the program's chat mode to exchange messages with the user of the host PC, useful for training or tech support. At any time during your remote session, each PC can switch roles—a simple menu selection makes the host the guest and vice versa.

Here & There costs $149. It requires DOS 3.3 or higher, 640K of RAM, 1.2MB of disk storage, and a modem.

—Jeff Bertolucci

Here & There

A remote communications program with background file transfer and network access.

Fifth Generation Systems, Inc.
800/873-4384,
504/291-7221
List price: $149
Reader service no. 780

Webcorp's Peer-to-Peer Does Windows

When Goliath starts selling networking software, David has to market a LAN package that offers a little bit extra. Just ask Webcorp, whose new *Web for Windows 4.0* peer-to-peer LAN gives both DOS and *Windows* users full network access—something you won't find in Microsoft's competing *Windows for Workgroups*.

Web for Windows 4.0

WINDOWS A peer-to-peer LAN with Windows and DOS Interfaces.

Webcorp
415/331-1449,
415/331-0911 (fax)
List price: 5-user version $449, 10-user $765, 15-user $995, 30-user $1495
Reader service no. 781

Web for Windows is Webcorp's first networking program designed specifically for *Windows* users. But this doesn't mean DOS users are left out. Each $99 package includes both DOS and *Windows* interfaces—useful for *Windows* users who still spend a lot of time running powerful DOS apps, but who don't want to reenter *Windows* to access network drives or send electronic mail.

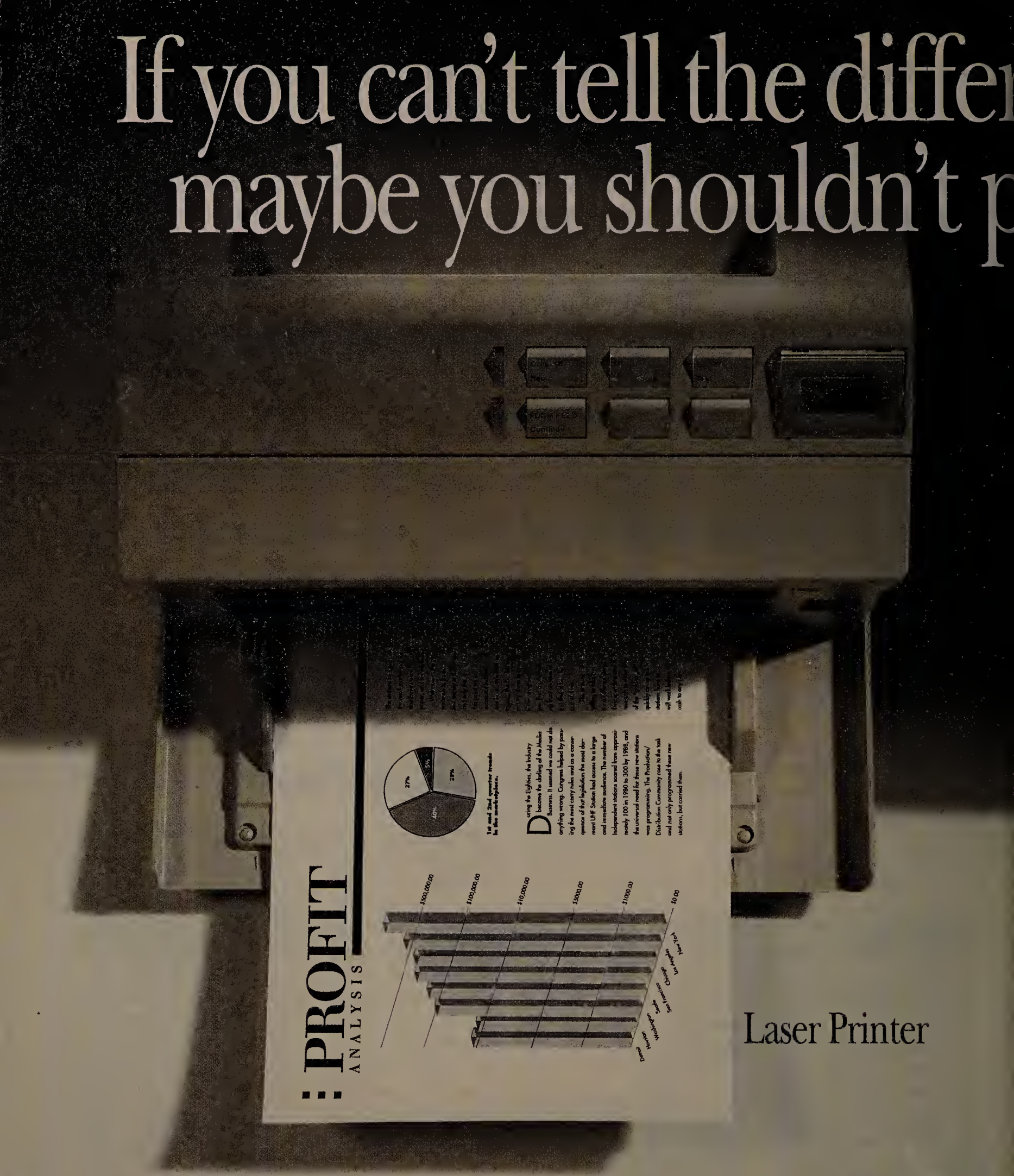
The installation process is as painless as possible: *Web for Windows* automatically loads all drivers and files it needs, and includes context-sensitive help to aid beginners. The program's graphical Station Manager interface offers *Windows* users an intuitive way to create or modify network links to drives and directories on other *Web* workstations. Another plus: *Web*-equipped PCs connected to a NetWare server don't require NetWare client software to access the server, which simplifies LAN access for work groups.

Web for Windows includes a no-frills electronic-mail utility called *E-Note*, a simple chat and messaging facility. *E-Note* includes a notification box that pops up over the application (DOS or *Windows*) you're in when you get new messages. *E-Note* is a separate module, so you don't have to load it if you're running a more powerful E-mail package.

Web for Windows will work with any network adapter that supports Novell NetWare. The software is priced at $99 per node. A 5-user version costs $449, 10-user $765, 15-user $995, and 30-user $1495.

—Jeff Bertolucci

If you can't tell the differ
maybe you shouldn't p



OK, concentrate. Look carefully at the page on the left. It comes from a laser printer. Notice how clear and sharp the text and graphics are.

Now, examine the one on the right. Printed by the Epson Stylus™ 800 Ink Jet Printer, which costs about half as much as the laser printer on this page.

No, there's nothing wrong with your eyes. The new Epson Stylus 800 is the right answer if you'd like the look of laser without paying the price.

It's whisper-quiet, compact, Windows® compatible, and fast: it prints at 150 cps.

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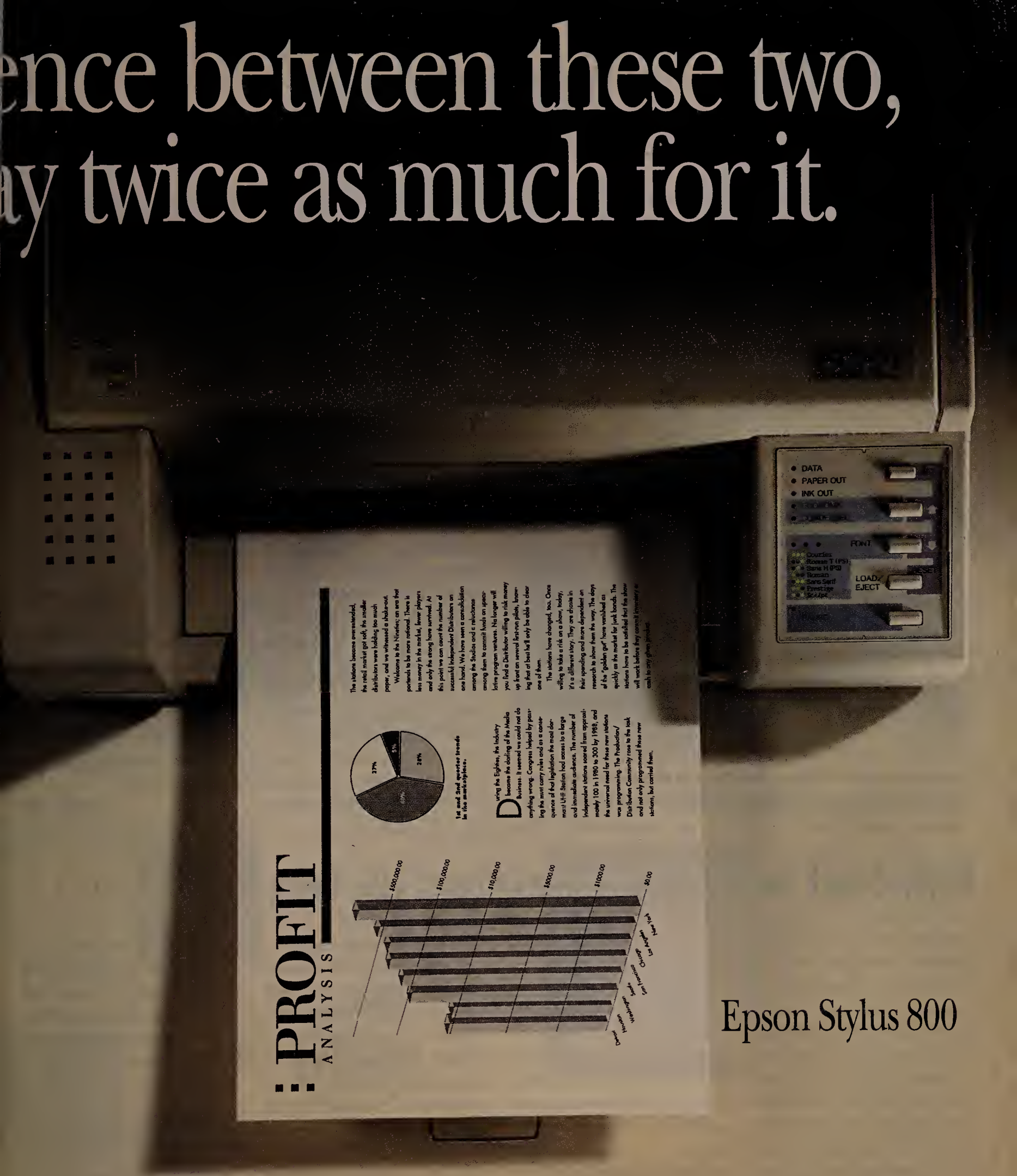

Epson Stylus 800

Plus, scalable fonts are standard. All making it the perfect printer for a small business or home office.

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Small-Scale Modem Sharing at Its Easiest

Multi-Tech Systems' MultiModemLAN makes sharing a fax-modem among 10 to 20 users on a Novell network, or establishing remote access to that network, cheaper and easier. Integrated into the product, which is the size of a thick magazine, is a high-speed fax-modem, an ethernet interface card, and enough PC hardware to enable the MultiModemLAN to run without a dedicated PC—sometimes required to share a modem on a LAN.

The $1995 MT1432ECT has a 386SX processor, and 10Base-2 and 10Base-T ethernet hardware for coaxial or twisted-pair cabling. The processor and 2MB of RAM allow the device to act as its own dedicated server, processing incoming commands for the fax-modem.

The MultiModemLAN includes a 14,400-bps modem with 9600-bps send-and-receive fax capabilities plus MNP-5 and V.42bis data compression and V.42 error correction.

SHARE A FAX-MODEM OR DIAL INTO THE LAN with the MultiModemLAN, which combines a high-speed fax-modem with an ethernet card.

Multi-Tech provides its own communications programs with the product. The MultiExpress program is a general-purpose package for dialing in, dialing out, and remotely controlling sessions. This product supports popular file transfer protocols and includes a script language. The MultiExpress Fax Server product handles ASCII, PCX, or TIFF files and includes a broadcast feature for faxing to groups. The MultiModemLAN works with popular off-the-shelf PC fax and communications packages as well.

Setup and installation are designed to be a cinch. Since the MultiModemLAN has no floppy drives or keyboard, you configure it and add the requisite software by downloading files to it from another PC on the LAN. The vendor claims that an average user with minimal knowledge of Novell NetWare can install the product in about 25 minutes.

The MultiModemLAN has a serial port so you can connect and manage a second modem and create a miniature modem pool. That way, if one modem is busy, the other kicks in and processes your call.

—Randy Ross

MultiModemLAN
The easiest way to share a modem across or add remote-control access to an ethernet NetWare LAN.

Multi-Tech Systems Inc.
800/328-9717,
612/785-3500
List price: $1995
Reader service no. 782

NetModem/E for Windows for Workgroups: Like Being There

You don't want to juggle multiple files; you simply want the latest version when and where you need it. Shiva's NetModem/E for Windows for Workgroups gives you precisely that by letting your PC operate as a real-time node on your corporate network.

This isn't Shiva's first or only dial-in network device, but this NetModem/E lets you tap the unique properties of Microsoft's *Windows for Workgroups*. Even across the country, you're a full participant in *Windows for Workgroups'* E-mail, scheduling, and file sharing facilities. You can access not only your own network node, but also the *Windows* files, applications, fonts, graphs, and graphics of your work-group peers.

Based on a 10-MHz 68000 processor with 512K of battery-backed SRAM and 64K of ROM, NetModem/E for Windows for Workgroups is a 3-pound, 9½-by-5½-by-1½-inch device that can be easily installed in a secure location on the network just by plugging in an ethernet cable and phone line, without an attached PC.

NetModem/E for Windows for Workgroups transfers data in packets at 14,400 bps. It can be accessed by any modem, but speeds below 9600 bps are not recommended. Its V.42/V.42bis error correction/data compression protocols can raise the effective transfer rate to 57,600 bps under optimum conditions.

Still, that's considerably slower than the 10-mbps speed of an ethernet network, so you probably don't want to pull your neighbor's *Word for Windows* code over the phone line—files and fonts yes. ShivaRemote lets you manage your data transfers from within *Windows for Workgroups*, while taking advantage of all the environment's file management facilities.

Being connected also lets you do some things you couldn't do with a regular modem, like access your network's resources—printers, scanners, faxes.

A NetModem/E for Windows for Workgroups base unit with EtherModule, Shiva Net Manager, and ShivaRemote carries a list price of $1699.

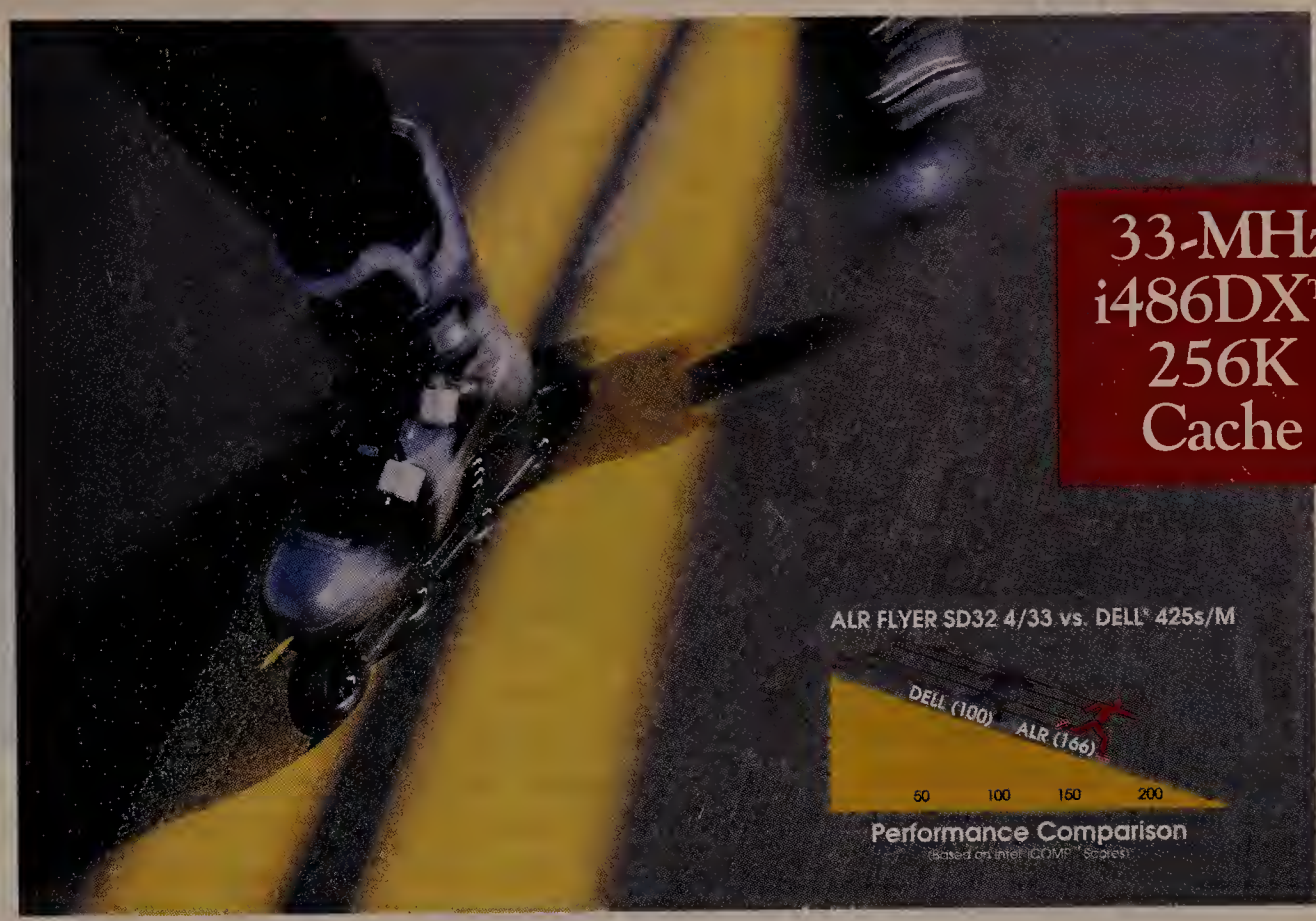
—Mike Hogan

NetModem/E for Windows for Workgroups
WINDOWS Staying in touch remotely has never been so easy.

Shiva Corp.
800/458-3550,
617/270-8300
List price: $1699
Reader service no. 783

Since the mid-1980's, ALR has been the PC manufacturer of choice among both leading edge power users and budget conscious consumers. This ability to expertly balance performance with value has earned us top honors worldwide.

To make certain that every ALR system keeps performing like a winner, we've created a service and support program that PC World described as being "among the best." A six-day-a-week, toll-free tech support hotline provides instant solutions to most problems, while our extensive on-site service program delivers both convenience and security. We even cover selected models with a 30-day money back guarantee, so you know you can buy with complete confidence!



SPEEDING IN-LINE

Staying In-Line Doesn't Mean Going Slow, Because ALR's 33-MHz i486DX FLYER Costs the Same as Dell's 25-MHz i486SX PC

The exhilaratingly fast ALR FLYER SD32 4/33 may look like a sensible, full-featured office PC, but to our competition, it's a killer. You see, the FLYER SD32 delivers scorching 33-MHz i486DX™ performance for less than Dell's comparably equipped 25-MHz i486SX PC. That's 66% more power* free!

How fast is the ALR FLYER SD32 4/33? Well, if you're used to working on a 386 powered PC, it can slice the time it takes to do some jobs in half. If you deal with numbers and graphics a lot, you can expect an even bigger performance boost. And you'll love the way it streaks through Windows applications.

With its 256-KB cache, the FLYER SD32 even has an edge over other i486 systems. Still, this is more than just a speed machine. Its 170-MB hard drive offers over 40% more disk storage than the Dell system. With 1-MB of video RAM and Windows graphics acceleration, it delivers 256 color Super VGA graphics ten times faster than standard VGA boards. And it has all the other extras you want in a ready-to-roll office PC.

So why get tied down by a slower system when the ALR FLYER SD32 gives you the blood-pumping performance you crave for the same money? Hey, if you're worried that all that speed will make your parents nervous, you can always wear a helmet. Just call ALR PrimeLine Direct, and we'll get you started on the fast track today.

	ALR FLYER SD32 4/33 Model 170	Dell425s/M	
Processor	33-MHz i486DX	25-MHz i486SX	
Math Coroccessor	Int. Math Copracessar	None	
CPU Upgradeable	Yes	Yes	
RAM	4-MB	4-MB	
Base Price		$1,021	
Hard Drive	170-MB	120-MB	add $279
External Cache	256-KB	128-KB	add $100
Video RAM	1-MB	512-KB Std. for 1-MB	add $50
SVGA Monitor	Included		add $299
DOS 5.0	Included		add $50
Windows 3.1, Mouse	Included		Add $100
Total	**$1,899**		**$1,899**

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- 33-MHz Intel® 386SX™
- 80-MB Hard Drive
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- Includes MS-DOS, Windows 3.1, ALR Mouse
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Circle 9 on reader service card

Word for Word for Windows

WINDOWS Mastersoft, maker of popular file conversion utilities for DOS and *Windows* word processors, is now shipping a stand-alone version for *Windows*. Like Mastersoft's *WinWord* version, which integrated into the word processor's File menu, the *Windows Edition* lets you convert between 100 file formats, from *Ami Pro* to *XyWrite*. But the $149 product now lets you convert batches of files, even when the files are stored in different directories. The new version also takes the guesswork out of file conversion by automatically recognizing the file's original format. And it comes with a "snapshot" file viewer that lets you peer into documents before converting, with all formatting, fonts, and colors intact. Mastersoft Inc., 800/624-6107, 602/277-0900, 602/970-0706 (fax).

Reader service no. 690

BitFax 4.0 for DOS

Bit Software's latest version of its *BitFax* fax software has a number of enhancements for DOS users, including a new interface that offers a multitude of ways to send, receive, and manipulate faxes. Use function keys, pulldown menus, command buttons, or <Alt>-*key* combinations, whichever works best for you. *BitFax 4.0* lets you send a fax from within any DOS application, including *WordPerfect 5.1*, *1-2-3*, and *Word*. Simply print to your faxmodem and up pops the *BitFax* interface to guide you through the procedure. The program is compatible with *BitFax for Windows*, handy if you send faxes from DOS and *Windows* applications. For example, you can schedule to send a fax in *BitFax for Windows*, then switch to a DOS application, and the $89 *BitFax 4.0 for DOS* will send your fax at the scheduled time. Bit Software, 510/490-2928, 510/490-9490 (fax).

Reader service no. 696

FaxGrabber 1.2

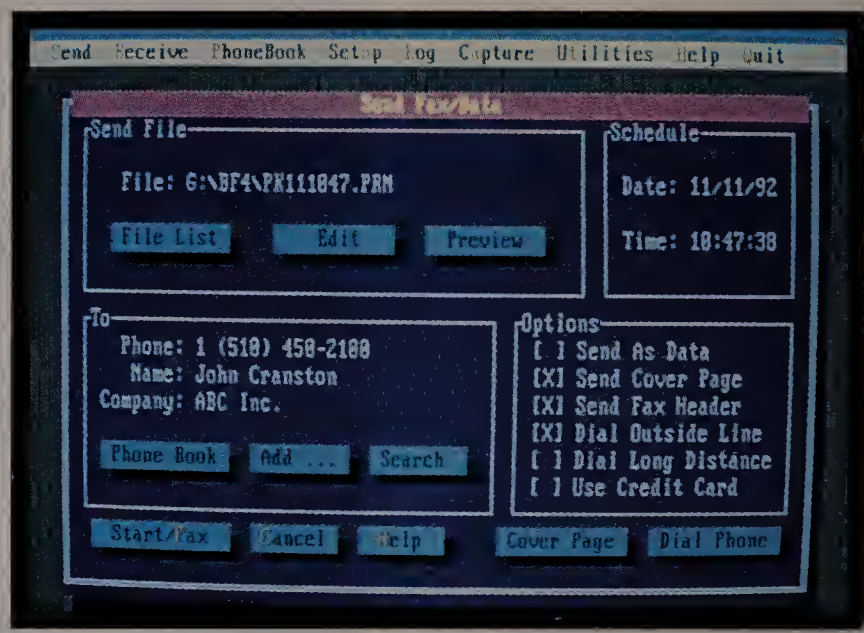
WINDOWS The latest upgrade of Calera's *Windows* fax conversion utility, which converts images received from a fax card into editable text, has several added attractions, not the least of which is a new price—$89—40 percent less than before. Calera has also added three more compatible fax software applications to its long list of supported programs: *FaxGrabber 1.2* works with Delrina's *WinFax Lite*, *RapidFax* by The Complete PC, and *BitFax* by Bit Software. In addition, Calera claims overall improvements to the program code have improved the accuracy of *FaxGrabber*'s OCR as much as 10 to 20 percent. Calera Recognition Systems, Inc., 800/422-5372, 408/720-8300.

Reader service no. 695

The Encyclopedia of Main Boards

The Encyclopedia of Main Boards is never going to compete with Stephen King in the page-turner sweepstakes. But if your office has an installed base of no-name clones or a bunch of older systems whose documentation has long since vanished, *The Encyclopedia* could be pretty compelling reading. It provides all the information you could want about thousands of motherboards: jumper settings, chip sets, specifications for the CPU, memory, and RAM cache, as well as an illustrated glossary of motherboard components. Volumes 1 through 5 cost $459.95. Micro House, 800/926-8299, 303/443-3388.

Reader service no. 691



BITFAX 4.0 FOR DOS features an improved interface that gives you many ways to send and receive faxes from within DOS applications.

PFS:First Choice 4.0

Spinnaker's upgrade to this popular DOS integrated package gives you improved versatility and functionality in its word processing, spreadsheet, and database modules. The word processor now offers you WYSIWYG text editing and viewing, scalable fonts, a grammar checker, and the ability to use multiple type styles within the same document. When using the spreadsheet, you can now sort, hide, and adjust the width of your columns. The database module has improved search capabilities and dBASE compatibility. *PFS:First Choice 4.0* lists for $119; upgrades are $59. Spinnaker Software Corp., 800/826-0706, 617/494-1200, 617/494-1219 (fax).

Reader service no. 699

Fidelity On-line Xpress 2.0

Fidelity On-line Xpress 2.0 is an upgraded software package and on-line service that lets users buy and sell stocks and mutual funds on line. Trading on line can cut 10 percent off Fidelity's own discount brokerage service fees. The Turbo Trader feature lets on-line traders obtain the current price quote and make the trade in a single session of about two minutes. Users can switch in and out of Fidelity mutual funds and about 80 other fund families. A 2400-bps modem is recommended, but the product supports 1200- to 9600-bps communications. It costs $119.95. Fidelity Investments, 800/544-0246.

Reader service no. 701

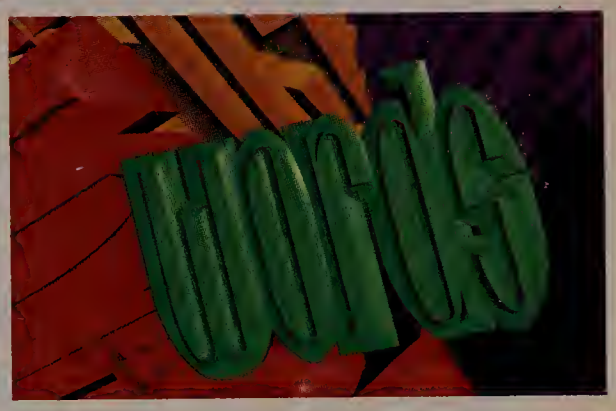
CA-Compete 5.0 for Windows

WINDOWS Computer Associates' *Compete 5.0* financial analysis and modeling software now includes the company's own macro language, CA-Realizer, and is compatible with *Windows 3.1*. Also, *Compete 5.0* is about six times faster than its predecessor, the vendor claims. Designed for financial modeling, *Compete* lets you create what-if scenarios and generate more views of your data than conventional spreadsheets. Some spreadsheets claim to be three dimensional, letting you see rows and columns on multi-

For Macintosh and Windows

Pixar Typestry

The Greatest Software for Creating Dimensional Type.



Pixar Typestry™ turns your Type 1 and TrueType fonts into dimensional text. You work in an easy, familiar 2D space, but you get amazing 3D results. Typestry includes Pixar's powerful RenderMan so your image has the same professional quality you have seen in some of your favorite movies.

Typestry is great for making:

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- Letterheads
- Book Covers
- Greeting cards
- Brochures
- Presentations
- Mastheads
- Ads
- Illustrations
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With Pixar Typestry, you turn your fonts into 3D objects. Move and rotate them wherever you want. Cover them with interesting Looks. Add lights, shadows, special effects... even make a little movie.

Typestry images can be gracefully imported into other applications like Photoshop, PhotoStyler, PageMaker, Persuasion and QuarkXPress.

P · I · X · A · R

Circle 210 on reader service card

Typestry users say...

- "MAJOR KUDOS!! Good Job!"
- "Great App. Even better Manual"
- "The interface is great."
- "Whow! What a concept — Absolutely fantastic! Having great times with it — creating some real beauties."
- "I can't remember being as excited about a product since falling in love with Illustrator and Photoshop."
- "This is a rare case where the product performance exceeds the copy writer's claims. I'm amazed."

Pixar Typestry is available for Macintosh and Windows in your favorite catalog or computer store or call

1-800-888-9856

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ACT Plus is the complete accounting software needed to run successful businesses. Pure and simple: no other accounting package combines power, flexibility and value like **ACT Plus.**

Easy installation, an extensive manual and on-line help quickly put the full power of **ACT Plus** at your fingertips.

ACT Plus features ease-of-learning and ease-of-use with a point-and-shoot interface. It allows adding customers, employees, vendors, etc. "on the fly," plus sales history tracking, inventory analysis, audit trails and full tax support (including W-2, 941 reports and plain paper forms).

ACT Plus includes GL, AP, AR, Inventory, Order Entry, Purchase Order, Payroll, Check Reconciliation, and import and export of files with Lynx. Unlike Quicken, **ACT Plus** gives your business unlimited growth possibility with easy upgrade path to networks or UNIX. An optional Point-of-Sale module can be fully integrated to ACT Plus giving full integration from the front of the store to the back office accounting (all from one manufacturer!).

Only **$199.50** plus shipping & handling

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30 DAY MONEY BACK GUARANTEE

VALUE COMPARISON	ACT Plus	Quicken	Great Plains
FULL-FUNCTION ACCOUNTING	YES	NO	YES
NO. OF MODULES	9	1	9
NETWORK CAPABLE	YES	NO	YES
POINT-OF-SALE CAPABLE	YES	NO	YES
AVERAGE PRICE PER MODULE	$22.22	$49.95	$695.00

Call Now! (800) 388-3038

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Circle 56 on reader service card

ple pages. But *Compete* lets users create and compare 12 "dimensions" or categories for data. Using drag-and-drop, users can then rotate the dimensions to show data in different ways. *Compete 5.0* costs $495. Computer Associates, 800/225-5224.

Reader service no. 702

Optima Pocket Edition/PCMCIA

These two tiny portable modems from Hayes Microcomputer Products, the Optima 144 + Fax144 Pocket Edition and the Optima 24 + Fax96 for PCMCIA, offer mobile communications in compact packages. The Optima Pocket Edition is an 8½-ounce external fax-modem. It sends and receives faxes and data at 14,400 bps and includes V.42bis for 4-to-1 data compression. It comes with serial port and telephone cables, a battery pack, an AC adapter, and a carrying case, as well as Hayes's *Smartcom EZ* and *Smartcom Fax* communications software, and costs $599. The Optima 24 + Fax96 for PCMCIA is Hayes's first credit card–size fax-modem that conforms to the PCMCIA 2.0 standard. Capable of transmitting data at 2400 bps and faxes at 9600 bps, the Optima for PCMCIA also includes V.42bis for data compression. It comes with *Smartcom EZ* and *Smartcom Fax* and costs $399. Hayes Microcomputer Products, 404/441-1617, 404/441-1213 (fax).

Reader service no. 700

CA-SuperProject 3.0 for Windows

WINDOWS Computer Associates' new version of *SuperProject* is more customizable than the previous one and has additional graphics capabilities. It's one in a series of new CA products that use CA-Realizer as the common macro language. A new built-in CA-Realizer application, the Project Manager's Assistant, provides an interactive help system to guide users through the analysis and reporting of a project. Another improvement is DDE support, which allows hot links of graphs and data with compatible software programs. A new DLL interface allows integration with other languages, including CA-dBFast, Microsoft Visual Basic, and Microsoft C. Plus, there are also new customizable fields and formulas, enhanced scheduling features, more flexible charts, and more page format options. The package is priced at $895. Computer Associates, 800/225-5224.

Reader service no. 703

Commence 1.01

Jensen-Jones, makers of the contact manager/PIM *Commence*, and AT&T have entered into a joint marketing agreement to sell *Commence 1.01* at $395 with the AT&T Partner and Legend PBX systems. The telephone integration features in the new version create a bridge between *Commence* and your telephone. Not only can you control your phone from within *Commence*, but the program can take action on incoming and outgoing calls as they're being placed. *Commence* has a keypad for screen-based dialing and standard phone function buttons. Jensen-Jones Inc., 800/289-1548, 908/530-4666.

Reader service no. 697

For more information about any product, contact the manufacturer or circle the number on the reader service card.

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1. Curtis Glass Filter Plus —
Relieves eye strain and fatigue, cuts glare up to 99%, and reduces VLF radiation up to 98%.

2. Curtis Monitor Arm —
Positions and adjusts monitor to optimum viewing angle to reduce glare and improve posture. Both arm and platform swivel 360°.

3. Curtis Keyboard Organizer —
Keeps supplies in reach and relieves tired, aching wrists with built-in wrist rest. (Wrist rest also available separately.)

4. Curtis Clip —
Holds copy next to monitor to reduce eye fatigue and neck strain by eliminating constant refocusing from desktop to monitor.

5. Curtis Wrist Rest —
Supports wrists at a more comfortable height to help reduce pain and fatigue.

6. Curtis Mouse Pad Organizer —
Built-in wrist support relieves sore, tired wrists. Pad improves pointing accuracy and pen/pencil tray organizes supplies.

Curtis offers many practical and low cost accessories that can reduce everyday physical stress and strain from computing.

Long periods of highly routine computing can harm your physical and mental well-being. That's why Curtis offers an entire family of ergonomic accessories to improve your computing health and comfort.

Choose from eye-saving Copy Clips and Glare Filters, wrist-saving Keyboard Organizers with Wrist Rests, and posture enhancing Monitor Arms. In no time, you'll be able to feel the difference these innovative Curtis accessories make in your personal computing comfort and well-being.

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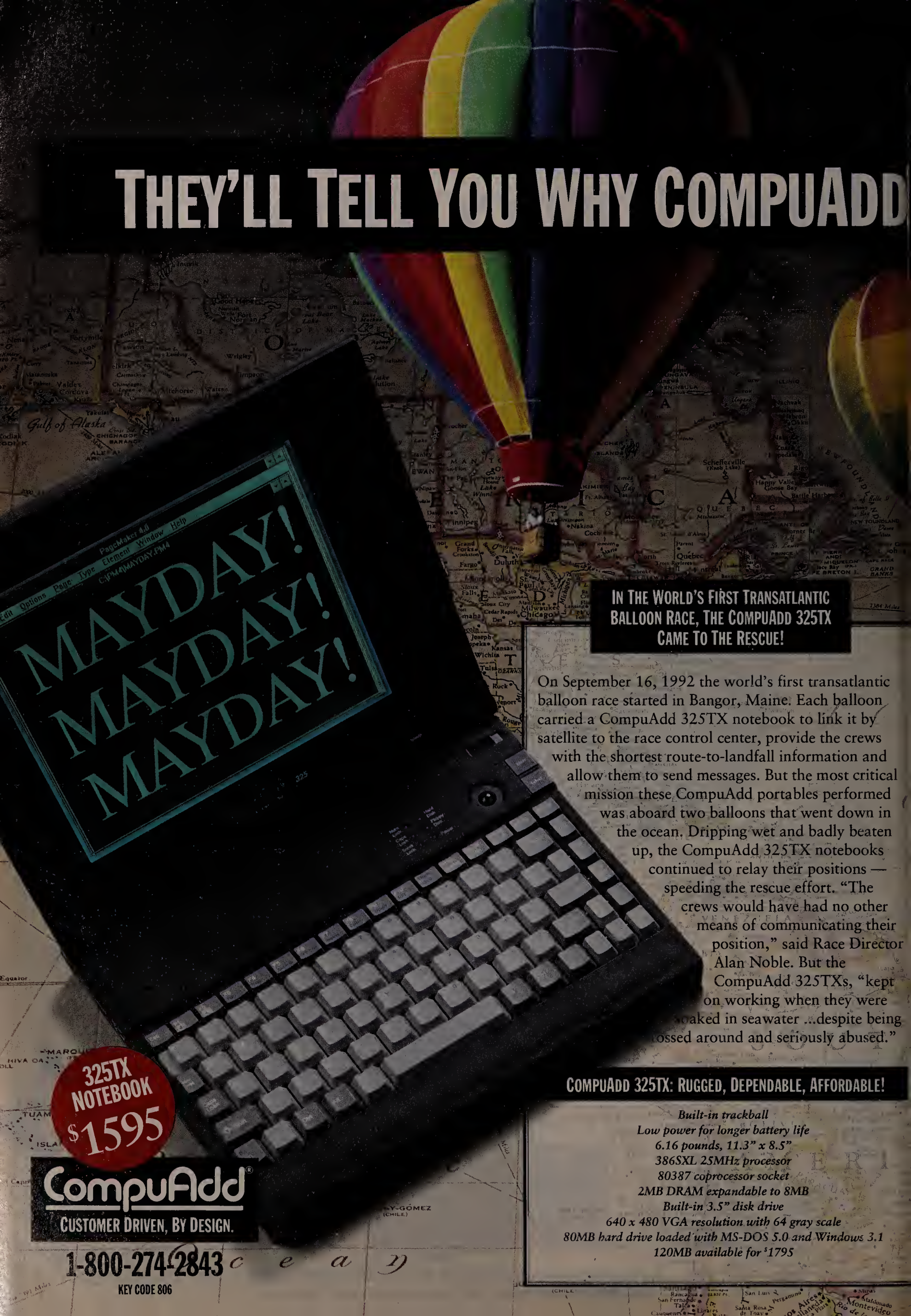
THEY'LL TELL YOU WHY COMPUADD



IN THE WORLD'S FIRST TRANSATLANTIC BALLOON RACE, THE COMPUADD 325TX CAME TO THE RESCUE!

On September 16, 1992 the world's first transatlantic balloon race started in Bangor, Maine. Each balloon carried a CompuAdd 325TX notebook to link it by satellite to the race control center, provide the crews with the shortest route-to-landfall information and allow them to send messages. But the most critical mission these CompuAdd portables performed was aboard two balloons that went down in the ocean. Dripping wet and badly beaten up, the CompuAdd 325TX notebooks continued to relay their positions — speeding the rescue effort. "The crews would have had no other means of communicating their position," said Race Director Alan Noble. But the CompuAdd 325TXs, "kept on working when they were soaked in seawater ...despite being tossed around and seriously abused."

COMPUADD 325TX: RUGGED, DEPENDABLE, AFFORDABLE!

Built-in trackball
Low power for longer battery life
6.16 pounds, 11.3" x 8.5"
386SXL 25MHz processor
80387 coprocessor socket
2MB DRAM expandable to 8MB
Built-in 3.5" disk drive
640 x 480 VGA resolution with 64 gray scale
80MB hard drive loaded with MS-DOS 5.0 and Windows 3.1
120MB available for $1795

325TX NOTEBOOK
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For the same price other computer companies are charging for a monochrome notebook, CompuAdd brings you 486 power and color — all in a 7 pound package. The CompuAdd 425C color notebook comes with a math coprocessor built in, a full four megabytes of DRAM and SIMULSCAN support so you can run full color presentations on the LCD and a monitor at the same time. You also get a built-in trackball, an automatic sleep key and Microsoft's APM (Advanced Power Management) for longer battery life in DOS and Windows. Plus a unique System Status Window that shows battery level, power management status, modem ring status and more! Choose from an 80MB or 120MB hard drive — either way it's pre-loaded with MS-DOS 5.0 and CompuAdd Windows 3.1 so you're ready to go!

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82-key keyboard emulates 101-key layout
11.6" x 8.2" x 1.8"
Travel weight under 7 pounds
Optional 2400 baud modem with 9600 baud send/receive fax modem
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We Don't Make Lots Of Money

We Make Lots of Software!

"DesignCAD...is a case study of what can be achieved when a software producer commits to excellence. A great interface, logical commands, and vertical integration into 3D combine with a great price ($349) to make...a superior buy once again." - PC Magazine March 1993.

Typical DesignCAD 3D drawing. Courtesy Old World Graphics, Philadelphia, PA.

DesignCAD Release 6.0 added hundreds of new features and improvements. For this reason, our dealers and distributors felt a price increase was in order. Some complained they made more money selling competing products. It's always been our belief that a computer-aided-design (CAD) system shouldn't cost more than a good word processor. In the finest American Tradition we said, "Aw...What the Heck. Let's see the other guys beat our deal! Let's keep the price low, and sell big quantities."

DesignCAD 2D Still $349 suggested asking price

DesignCAD 2D Release 6 offers an amazing amount of CAD power for the low price. Features such as a built-in programming language and an on-line manual are standard. Distance,bearing, and center-of-gravity measurements are just a few of the advanced calculation capabilities available. DesignCAD 2D is not a low performance CAD system. It's only low priced!

Who Uses DesignCAD?

Studies indicate the average DesignCAD purchaser is a Fortune 1000 company with more than 500 employees and 100 million dollars per year in total sales. However, due to the low price, a large number of DesignCADs are sold to "average" computer users for ordinary projects. DesignCAD gives you the power and sophistication to complete **any** type of project

What Can You Do With DesignCAD?

Anything! Design your own home, porch, or room addition. Landscape your home. Create technical drawings, do cross-stitch needlework patterns, stain glass window designs, model airplane designs, futuristic vehicles, or design small thermonuclear devices (not a recommended use). Design real-life space vehicles, such as the space shuttle. Do all types of space management and facilities designs. DesignCAD eliminates the age-old drafting board.

The uses for DesignCAD 2D are only limited by YOUR imagination!

What about 3D?

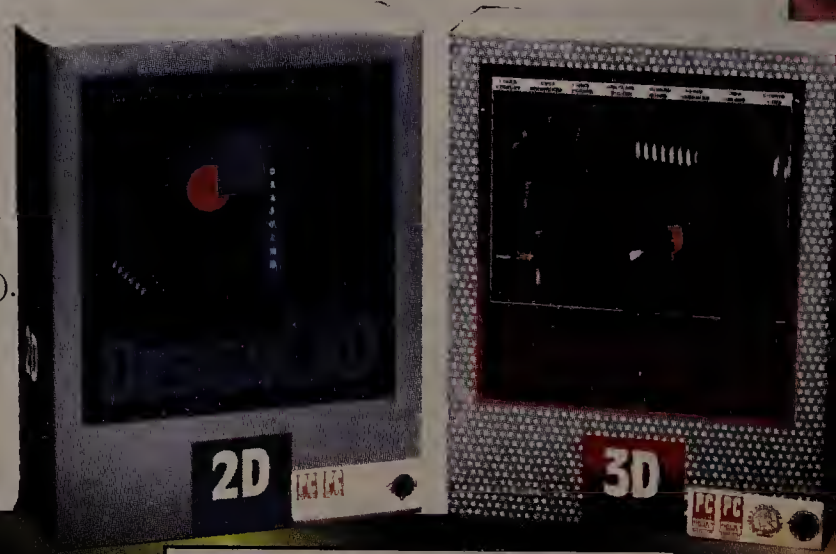
We've got it! We offer DesignCAD 3D for only $499. DesignCAD 3D offers power and features not found on systems costing thousands of dollars more.

Which Do I Buy?

In general, DesignCAD 2D is the best choice for all drafting applications. DesignCAD 3D is best used for simulation; to see what something looks like before it's built. If you have questions about which program is best suited to your needs contact our Sales Department.

Do You Offer a Bundle?

Yes, we offer DesignCAD-The Professional Series. This package combines DesignCAD 2D, DesignCAD 3D, ScanPro Raster-to-Vector conversion software, and 6700 symbols all in one complete package. For the name of your nearest dealer or for information and a **FREE** demo disk, fax or call the numbers below.



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Circle 1 on reader service card

Marketplace

A Monthly Survey of Prices on Popular Models

Over the Counter

What you pay at retail stores for popular PCs

n/a = not applicable

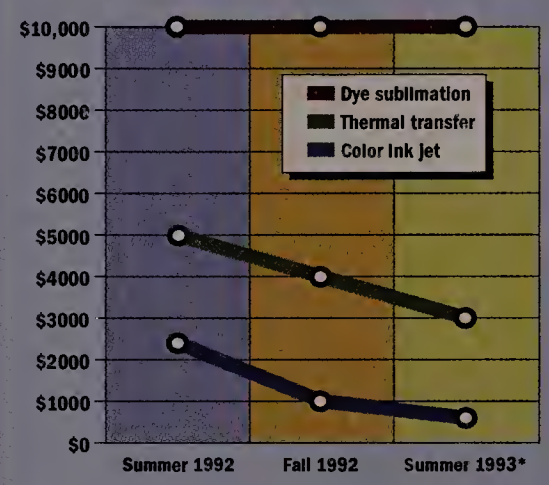
	Configuration			National	
	CPU/speed (MHz)	RAM (MB)	Hard disk (MB)	List	Average street price
386SX/SLC-based desktop PCs					
ALR Flyer SC 3/33s	i386SX-33	2	80	$799	$706
DEC DECpc 333sx LP	i386SX-33	4	52	$999	$999
Gateway 2000 3SX-25	i386SX-25	4	80	$945	$945
IBM PS/ValuePoint 325T	IBM 386SLC-25	2	80	$889	$889
NEC PowerMate SX/25i	i386SX-25	2	60	$1229	$1104
386DX-based desktop PCs					
AST Power Premium 3/33[1]	i386DX-33	4	210	$3095	$2643
Compaq Deskpro 3/33i	i386DX-33	4	120	$1979	$1806
Compaq Deskpro 386/33M[1]	i386DX-33	4	120	$2569	$2286
486SX-based desktop PCs					
ALR Flyer SD 4/25s	i486SX-25	4	170	$1099	$959
AST Bravo 4/33s	i486SX-33	8	213	$1995	$1787
Compaq Deskpro 486s/25M[1]	i486SX-25	4	120	$2569	$2304
Compaq ProLinea 4/25s	i486SX-25	4	240	$1459	$1340
DEC DECpc 425sx LP	i486SX-25	4	122	$1449	$1449
Dell System 425SE[1]	i486SX-25	4	230	$3100	$3100
Gateway 2000 4SX-25	i486SX-25	4	170	$1120	$1120
Hyundai 433S	i486SX-33	4	170	$1799	$1799
IBM PS/ValuePoint 425SX	i486SX-25	8	170	$1357	$1357
ZDS Z-Station 425Sn	i486SX-25	4	200	$1800	$1800
486DX-based desktop PCs					
AST Bravo 4/66d	i486DX2-66	8	210	$2895	$2610
Compaq Deskpro 4/66i	i486DX2-66	4	240	$2949	$2665
DEC DECpc 466d2 LP	i486DX2-66	8	245	$2599	$2599
Dell 466/M	i486DX2-66	8	320	$3050	$3050
Gateway 2000 4DX2-66V	i486DX2-66	8	340	$2425	$2425
HP Vectra 486/33ST[1]	i486DX-33	4	430	$5249	$4461
IBM PS/ValuePoint 433DX	i486DX-33	8	120	$1516	$1516
IBM PS/2 Model 90 XP-OLF[2]	i486DX2-50	8	400	$5020	$4407
NEC PowerMate 486/50i	i486DX2-50	4	240	$2949	$2486
Zeos 486DX/33	i486DX-33	8	245	$2395	$2395
Portable PCs					
AST PowerExec 3/25SL	i386SL-25	4	60	$2395	$2139
Compaq Contura 3/25	i386SL-25	4	120	$2099	$1919
Compaq Contura 3/25c	i386SL-25	4	84	$2499	$2292
Dell Dimension NL25	i386SL-25	2	80	$1649	$1649
Gateway 2000 Nomad 420SXL	i486SX-20	4	80	$1995	$1995
Hewlett-Packard 95 LX	NEC V20-5	1	n/a	$799	$561
IBM ThinkPad 700	IBM 486SLC-25	4	80	$2750	$2577
NEC UltraLite SL/20	i386SL-20	2	80	$1699	$1470
TI TravelMate 4000WinDX	i486DX-25	4	120	$3299	$2938
Toshiba T3300SL	i386SL-25	2	80	$2299	$2033
Toshiba T4400C	i486SX-25	4	120	$3999	$3577
ZDS Z-Note 325Lc	i386SL-25	4	120	$3499	$3499

From a national survey of more than 180 dealers by International Data Corporation. Figures are based on at least four price quotes for each machine. Prices are based on manufacturer's standard configuration without monitor.

[1]Uses EISA bus. [2]Uses MCA bus.

Color Printing Becomes More Affordable

Quality goes up as prices go down



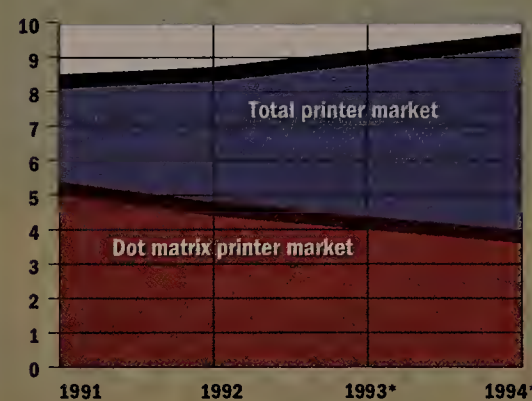
Color printer prices dropped steadily during the past two years and should continue their descent in 1993. Vendors are expected to add more low-priced models to their existing lines, according to industry analyst Bill Flynn at BIS Strategic Decisions. Of the three common types of color printers—dye sublimation, thermal transfer, and color ink jet—color ink jets and thermal transfers will offer good values as printer companies raise quality and lower prices, Flynn says. Dye sublimation printer prices should remain stable at around $10,000.

***Estimated prices**

Source: Vendor list prices and BIS Strategic Decisions

Dot Matrix Printers: Down but Not Out

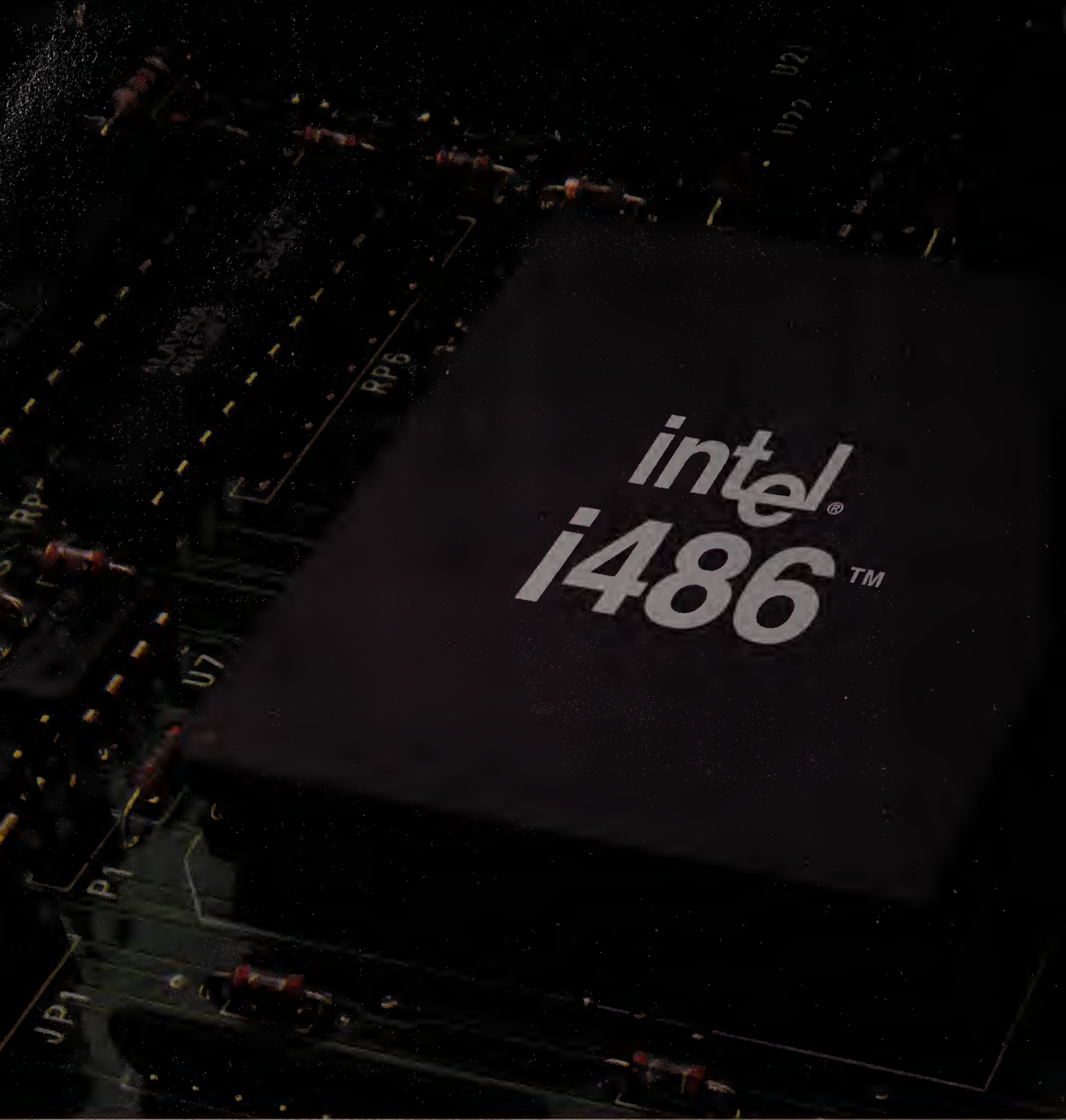
Units in millions



Though dot matrix printers face serious competition from low-priced ink jets, their prices should remain stable, says Angele Boyd, director of printer research at International Data Corporation. Unit shipments are gradually declining: IDC estimates a drop from approximately 54 percent of total U.S. printer purchases in 1992 to 46 percent in 1993. But don't look for price cuts. Instead, vendors will increase performance, reduce noise levels, and add fonts.

***Estimated shipments**

Source: International Data Corporation



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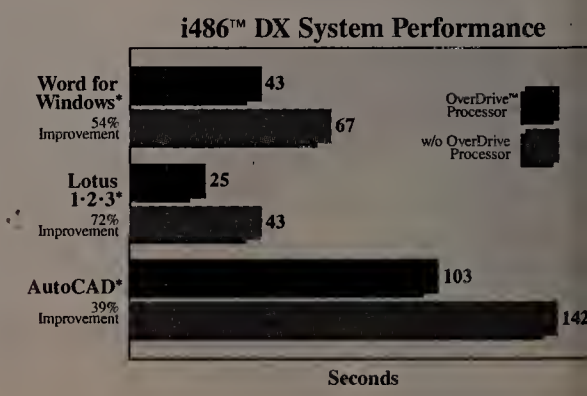

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†In cases where there is no OverDrive Processor socket, Intel recommends installation by a qualified technician.

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Plus, it doesn't take long to install an OverDrive Processor. Simply plug it into the vacant OverDrive Processor socket† and you're off and running. Faster.

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Great Software

Quality doesn't always come with a price tag. Two experienced bargain hunters pick 45 top low-priced programs to round out your suite of mission-critical applications.

Everyone loves a bargain, and the software world is full of them—if you know where to look. In this day of $795 applications, it's nice to know that you can still buy a program for less than a meal in a good restaurant.

To discover the finest in inexpensive software, we checked out BBS's, talked to user groups, asked retailers, and slogged our way through over 4MB of product listings sent to us by *PC World*. Finally, we went red-eyed examining the programs that seemed likely candidates. One of us (Steve) checked out the DOS programs, while the other (Scott) remained in *Windows*.

The programs we unearthed fall into just about every category imaginable: utilities, communications programs, personal information managers, and even spreadsheets. Some of the programs are *shareware*—software that's distributed free but that you're expected to pay for if you decide to keep it—but most are commercial packages that you can buy shrink-wrapped at your local computer store.

How do you draw the line at $50 with

By Steve Bass and Scott Dunn

JON LUCICH

Under $50

BRARY PC

commercial software? After all, list (suggested retail) prices are about as realistic as a politician's promise, and we didn't want to leave out worthy programs that officially cost more than $50 but in reality sell for less. The solution: We included programs with list prices over $50 if we could find them on sale for less than $50 in at least four stores or mail-order houses.

What's better than cheap software? Free software. So we picked a few favorite programs that cost nothing at all. These *freeware* programs are distributed like shareware, only you're not expected to send a check if you like them. Look for the *Free* boxes scattered throughout the article.

Whether you're paying little or nothing for your software, it's better than paying a lot. Read on for descriptions of some of the finest programs you can buy without breaking the bank.

Imposter 1.01

WINDOWS

***Imposter* combines all the advantages of *Windows* memory management, multitasking, and program launching with the traditional DOS commands, in what looks like a plain DOS window. By simply typing a command, you can launch DOS programs (in their own windows) and *Windows* applications, either from the command prompt or through traditional batch files. You can even launch an application by typing the name of an associated data file. Available as IMPOST.ZIP on PC World Online and other on-line services. —S. D.**

Communications

BitCom for Windows 1.04a

WINDOWS When it comes to basic communications chores, such as accessing information services or transferring files, *BitCom for Windows* is a live wire. The interface includes a Rolodex-like dialing directory, a button bar along the top for common tasks, and a set of buttons at the bottom that correspond to the equally user-definable function keys. The package includes a scripting language that is backward compatible with the DOS version. *BitCom* supports several common terminal emulations, including VT100; Wyse 50 and 60; Televideo 920 and 925; ANSI; and several of IBM's; and all the major transfer protocols. The list price is $49. Bit Software, 510/490-2928, 510/490-9490 (fax). —*S. D.*

Reader service no. 605

BitFax for Windows 2.05

WINDOWS For cheap faxing, there's no better solution than *BitFax for Windows*. Compatible with most fax-modems, *BitFax* lets you use any *Windows* application's Print command to transmit a fax. The program will automatically redial if the line is busy, or try a different number if you're faxing to more than one destination. You can also print a fax to disk and schedule *BitFax* to send it at a later time. You can create a phone book (and phoning groups) for numbers you commonly call, and generate a cover sheet complete with your own BMP-format logo. *BitFax* also receives faxes, of course, and then lets you view, rotate, print, or save what you've received in BMP, PCX, or its own formats. *BitFax for Windows* lists for $59, but I've seen it discounted as low as $44.95. Bit Software, 510/490-2928, 510/490-9490 (fax). —*S. D.*

Reader service no. 606

Easydial 4.4

SHAREWARE Let's say you're sitting at your desk with a ton of high-tech equipment in front of you, and you need to make a call. Instead of dialing with your fingers—decidedly *low*-tech—you can have *Easydial* and your modem automate the process. This cheap, easy, yet remarkably versatile dialer gives you up to 70 characters per entry, enough to handle credit card numbers and prefixes, and can pause as needed. *Easydial* stores your phone numbers in an ASCII file, handy for adding, editing, and importing entries. When you're ready to dial a number, the program's Find feature searches your phone book and quickly locates the right name. *Easydial* even lets you time the call's length and add a short comment to a log. The program is available as EASYDIAL.ZIP on PC World Online and other on-line services. Registration fee: $20. PatriSoft, 714/352-2820, 714/352-1527 (fax), 714/352-2825 (BBS). —*S. B.*

Reader service no. 607

Lync 3.0

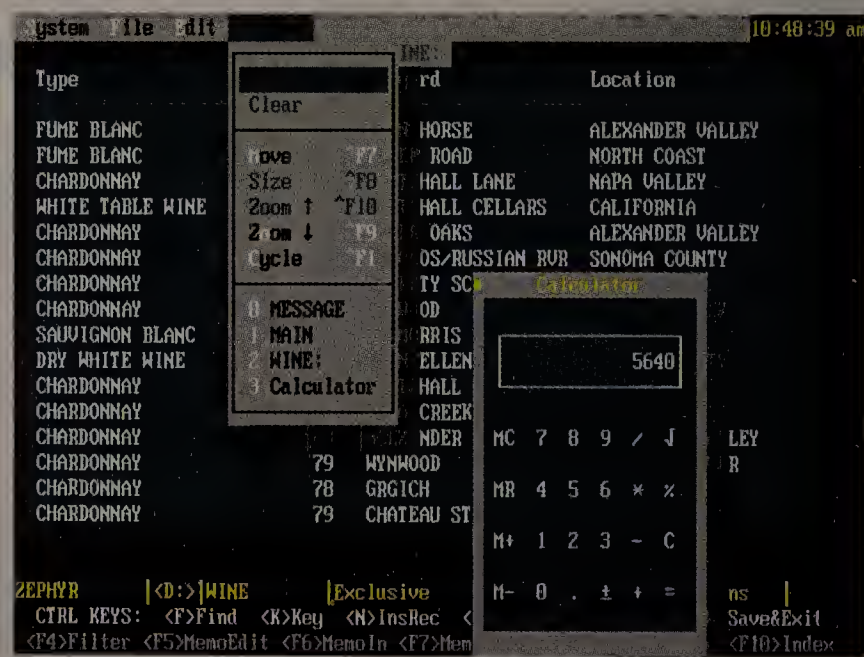
SHAREWARE This efficient little communications program requires less than 95K of free memory and fits on a floppy. However, its small size doesn't mean small features: *Lync* lets you access BBS's at speeds from 300 to 38,400 bps and use serial ports from COM1 through COM4. The dialing directory holds 45 entries and offers auto-redial, tagging, and auto-dialing of tagged entries. The program supports most major transfer protocols, including YMODEM and ZMODEM. It's easy to use, too, with good menus, function key macros, and plenty of <Alt>-*key* shortcuts for quick access to all features. Available as LYNC.ZIP on PC World Online and other on-line services. Registration fee: $25. Jason R. Alward, 613/224-3539. —*S. B.*

Reader service no. 608

Data Management

MyDataBase

Want a quick and easy way to manage your data? *MyDataBase* may be just what you need. It isn't *Paradox*, but for about $20, discounted, you get a solid package with a surprising number of features: label and



IT MAY LOOK LIKE FOXPRO, but it's really Zephyr, an inexpensive and easy database built around the FoxPro engine.

report generation, free-form screen layout, calculated fields, filtering, and sorting up to three levels deep. You can put as many as 40 fields in a record and 5000 records in a file. The program comes with ten predesigned formats, including customer contacts, employee records, and mailing lists. Just don't expect too much. *MyDataBase* doesn't have a programmable language, relational capabilities, or more than six pages of documentation. List price: $24.95. MySoftware Co., 800/325-3508, 415/325-9383, 415/325-3106 (fax). —*S. B.*

Reader service no. 609

Zephyr 4.0

✔SHAREWARE This menu-driven relational data manager uses the lightning-fast *FoxPro* run-time engine for full relational power. The program reads and writes in the industry-standard DBF file format and lets you simultaneously access up to 25 databases, each with as many as a billion records and 25 separate indexes. *Zephyr*'s interface makes it easy to design lists, reports, labels, and form letters with the built-in editor and form letter generator. And if you're feeling up to it, you can skip the interface and enter commands (but no full programs) in the powerful, *dBASE/FoxPro*-compatible language. Available as ZEPHYR4A.ZIP, ZEPHYR4B.ZIP, and ZEPHYR4C.ZIP on PC World Online and other on-line services. Registration fee: $50. Ward Mundy Software, 404/237-9420, 404/237-1167 (fax). —*S. B.*

Reader service no. 610

OZCIS

Navigating through CompuServe is far from easy, unless you use *OZCIS*. Here's how it works: While off line, you write E-mail, select forum topics, and respond to messages. Then let *OZCIS* go on line and deliver your missives, get stock market quotes, check the weather in your area, or whatever else you want. Since you do all your reading and decision making off line, your CompuServe bill drops dramatically. And it's all done with pull-down menus, mouse support, and context-sensitive help. *OZCIS* is so good, it's hard to believe it's free. Available as OZCIS1.EXE, OZCIS2.EXE, and OZCIS3.EXE on PC World Online and other on-line services. –S. B.

Fonts

Adobe Type Set Value Pack

WINDOWS

Imagine getting the latest version of *Adobe Type Manager* (2.5), 17 decorative display typefaces, 5 text typefaces, 5 script typefaces, and 3 symbol typefaces, all for less than $50. Now stop imagining—it's for real. The market pressure from TrueType has meant a price boon to desktop publishers and font freaks, any of whom would flip for access to Adobe's vast library of high-quality faces. Like the TrueType system that's built into *Windows*, *ATM* gives you scalable fonts on both your screen and printer, and I don't just mean a PostScript printer. These fonts work with OS/2 as well. The *Value Pack* lists for $60, but I've seen it as low as $38. Adobe Systems, 800/833-6687, 415/961-4810 (fax). —*S. D.*

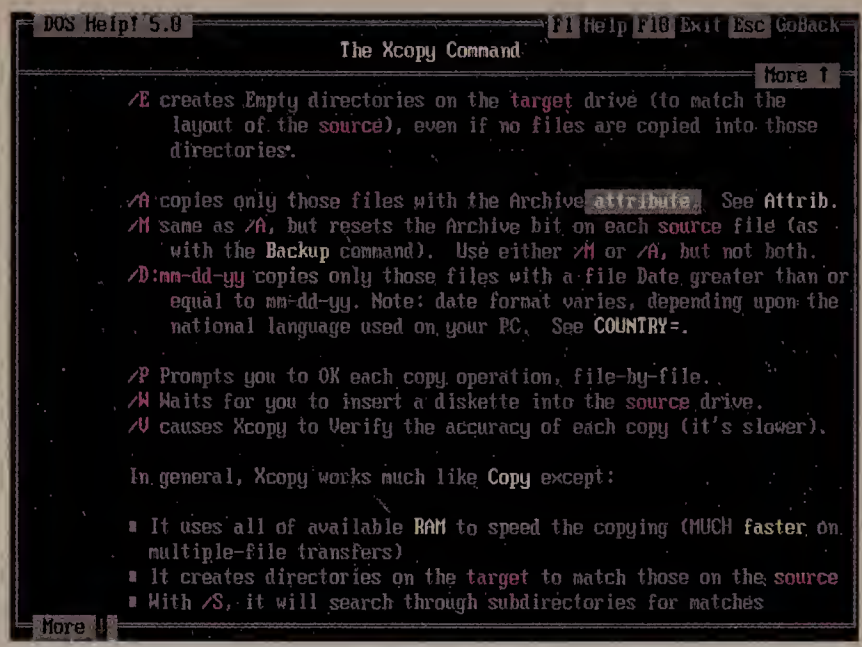
Reader service no. 611

Grammar Checkers

PC-Proof 1.5

✔SHAREWARE I'm lucky—*PC World*'s copy editors pore over my grammar, carefully noting my passive voice and split infinitives. *PC-Proof* wouldn't replace these live grammarians, but it's talented enough to catch problems like missing articles, subject-verb disagreements, incorrect capitalization, sexist terms, missing punctuation, and correctly spelled words that may be the wrong words ("The very pineapple of perfection!"). The program supplies a detailed explanation of each problem and works with most major word processors. But good grammar and proper usage has to cost something—$30 and about 850K of disk space. Available as PC-PROOF.EXE on PC World Online and other on-line services. Registration fee: $30. Intellect Systems, 206/226-0429. —*S. B.*

Reader service no. 612



QUICK AND COMPLETE, DOS HELP puts the entire syntax of DOS commands at your fingertips for $49.95.

Help and Training

DOS Help 5.0

So you can't remember how to use FIND? Well, you can always turn to DOS's skimpy help feature, or even call Microsoft's tech support. But for a nickel short of $50, you can load Flambeaux's *DOS Help*, an on-line resource that supplies information about practically every aspect of that popular but outdated operating system. You not only get the correct syntax for every DOS command, but you'll learn how to use the command through comprehensive tutorials with plenty of examples. You can leisurely explore the program's subjects or bring up help on a particular command. You can even load this program as a TSR—a real lifesaver when you're struggling with the innards of a batch file and need quick reference. List price: $49.95. Flambeaux Software, 818/500-0044, 818/957-0194 (fax). —*S. B.*

Reader service no. 613

Professor DOS

We all know how DOS's NUL works, right? And when it comes to writing a batch file, well, who needs 'em, anyway? But if you *are* intrigued by DOS and want to figure out how things work, load *Professor DOS*. For under $30 discounted, you'll be able to go through the basic and advanced tutorials, learning about DOS concepts, hard disk management, DOS 5.0's Shell and configuration issues, and a lot more. You'll also get lessons on such tools as DOSKEY macros, DEBUG, QBasic, and EDIT. List price: $49.95. Individual Software, 800/822-3522, 510/734-6767, 510/734-8337 (fax). —*S. B.*

Reader service no. 614

Legal and Official Documents

It's Legal 3.0

Occasionally I need to whip up a legal document, say, a bill of sale or an employment agreement. But I try to avoid attorneys—no matter *whose* side they're on. That's why my first consultation is with Parsons's *It's Legal*, a program with a comprehensive catalog of legal documents you can use to create your own customized forms. *It's Legal* helps me with corporate and business contracts, leases, living trusts and wills, estate planning, power of attorney, and other legal folderol. The program even takes into consideration which state you live in and offers an on-line legal guide that helps you determine when you really *should* talk with a lawyer. *It's Legal* lists for $69, but I've seen it discounted to as low as $30. Listen, did you hear the one about the attorney who...Oh, never mind. Parsons Technology, 800/223-6925, 319/395-9626, 319/395-0217 (fax). —*S. B.*

Reader service no. 615

Nolo's Personal RecordKeeper 3.0

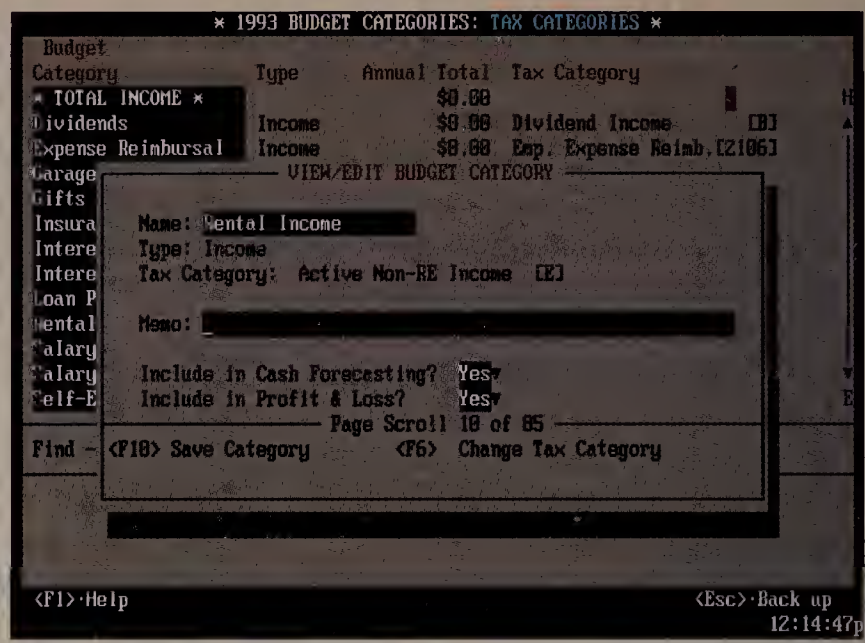
I've been nailed twice; first when my home was burglarized, second when my office flooded. But when the insurance company asked for proof of the items I listed as stolen or damaged, I was ready, thanks to *Nolo's Personal RecordKeeper*. This program, a repository for *all* my personal information, helped me get rid of my shoe boxes, manila folders, and envelopes jammed with papers. Its 27 categories are designed to catalog everything from vehicles and valuables to the location of locked places and keys, credit cards, and medical and emergency information. You can generate a home inventory report that lists item, category, amount, and location, and even a net worth report. What's more, you can export the data to Intuit's *Quicken* personal finance program. At $32 discounted, I consider it an inexpensive insurance policy. List price: $49.95. Nolo Press, 510/549-1976, 510/548-5902 (fax). —*S. B.*

Reader service no. 616

Detour 1.4

FREE

WINDOWS When you launch an application from File Manager by double-clicking a data file, *Windows* knows what program to load from the file's three-letter extension. Unfortunately, *Windows* lets you associate a given extension with only a single program. But when you associate an extension with *Detour*, double-clicking the file name brings up a user-definable menu of any programs you might want to launch. *Detour* requires the Visual Basic DLL (VBRUN100.DLL), which is available on most BBS's. Available as DETOUR.ZIP on PC World Online and other on-line services. –S. D.



TAX FORECASTING AND TAX CATEGORIES are among Andrew Tobias' Managing Your Money's many budget features.

Personal Finance

Andrew Tobias' TaxCut

Paying taxes is like going to the dentist; it's not supposed to be pleasurable. With Meca's *TaxCut*, it's at least tolerable, and maybe even fun. The process is simple: Go through the Enhanced Interview and plug in the data; *TaxCut* takes your entries and inserts them into any of the 85 forms that apply to your situation. You can play what-if scenarios—to see the impact of, say, buying a new car—and the Audit Flags in *TaxCut* alert you to potential problems that might bring you a visit from the IRS. The application can import data from a variety of programs, including *Quicken*, *Microsoft Money*, and *1-2-3*. *TaxCut* will print out IRS-approved forms or help you file electronically. It lists for $79.95 but is often discounted to $50. Meca Software, Inc., 800/288-6322, 203/256-5000, 203/255-6300 (fax). —*S. B.*

Reader service no. 617

Andrew Tobias' Managing Your Money 9.0

I've always liked Meca's *Managing Your Money*, but the price was more than I was willing to pay. Luckily, a lot of stores are discounting it these days, so I can once again browse Andrew Tobias' witty help screens. *MYM* has always been a master at investment tracking, and the new version has gone a step further. You can now use CompuServe to update your portfolios automatically, track pricing indexes, and monitor prices at whatever interval you want. If you have a SkyTel pager, you can have the program warn you when a stock falls within a specified price range. On the more mundane side, *MYM* also takes care of common chores like organizing your checkbook, pay-

CUSTOMIZING QUICKEN: We found this best-selling finance program for as little as $42.

ing bills electronically, and effortlessly determining your net worth (which may or may not be a pleasant experience). *Managing Your Money* lists for $79.95, but I've seen it discounted to around $43. Meca Software, Inc., 800/288-6322, 203/256-5000, 203/255-6300 (fax). —*S. B.*

Reader service no. 618

Quicken for Windows 2.0

WINDOWS *Quicken* is the best-selling finance package for home and small-business users, and for good reason. It's easy to use, with pop-up user tips, a configurable icon bar, and screens that look like their real-world equivalents (for example, the checking account window mimics a check register). You can plan, track, and manage multiple accounts, such as checking, savings, cash, and investments. People with small businesses will like the ability to create income statements, balance sheets, cash flow reports, charts and graphs, and payroll checks. *Quicken* provides options for paying bills or accessing Visa statements via modem, and special calculators help you with financial planning for loans, investments, and savings. *Quicken* retails for $69.95 but sells for as little as $42. Intuit, 415/322-0573, 415/852-0155. —*S. D.*

Alldrive

This neat utility executes the same command across all drives. For example, to check all of your drives, just type ALLDRIVE CHKDSK. If you are ready for some housekeeping, *Alldrive* can make your disk optimizer defrag each of your drives. Available as ALLDRIVE.ZIP on PC World Online and other on-line services. —S. B.

Personal Information Management

Any Time

If your desk is covered with file folders, snippets of paper, and stray business cards (and under every pile is an alligator ready to pounce), now's the time to use *Any Time*. To help you track appointments, this pro-

Spinnaker: Seizing the Low Ground

In the wake of intense competition, a few companies are vying for new customers with great software at rock-bottom prices. One such company really caught our eye: Spinnaker Software. Its low-priced *Easy Working* programs are almost always solid and well designed, providing a great starting place for small businesses that need to get up to speed. Below are our favorites:

Easy Working Eight-in-One and Easy Working for Windows Eight-in-One

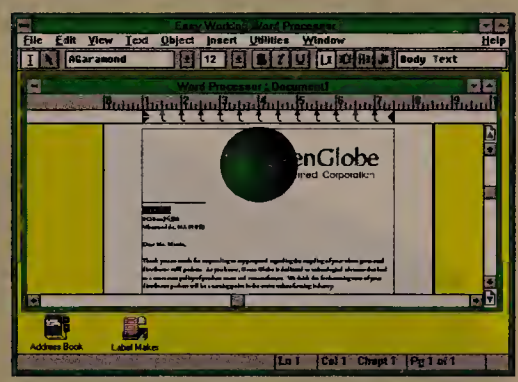
WINDOWS Both the DOS and *Windows* versions of *Eight-in-One* supply everything you'd expect: a good integrated software package, word processor, database, spreadsheet, communications tool, outliner, and desktop organizer. Each module integrates smoothly with the others, simplifying tasks like mail merging letters. The *Windows* version makes full use of the Clipboard. Despite a $59.95 list price, we found *Eight-in-One* selling for only $33.95.

Reader service no. 635

Easy Working Word Processor and Easy Working Desktop Publisher

WINDOWS Any word processor this cheap must be as lame as *Windows'* Write. Wrong! Spinnaker's *Easy Working Word Processor* offers paragraph styles, headers, footers, footnotes, a spelling checker, a thesaurus, table of contents and index generation, and even manual kerning. You can paste or import graphics files and dress up documents with lines, ovals, and boxes. The package even comes with an address book and a label maker. Everything has its price, however; you can work on only one document at a time, and forget about multicolumn pages. So a word of advice: If you don't need the address book and labeler, get *Easy Working Desktop Publisher* instead. It's really the same program minus the address stuff, except that it also supports multiple columns, can wrap text around graphics, and has a stripped-down version of the *Easy Working Spreadsheet* as a table editor. *Word Processor* lists for $49.95, and so does *Desktop Publisher.*

Reader service no. 638



SPINNAKER'S INEXPENSIVE Windows word processor offers serious page layout and mail merge capabilities.

Easy Working Presentation Maker

Creating eye-grabbing presentations can be quick and almost painless. With 24 ready-made charts, all you need to do is type in—or import—your text, and the work is done. And there are ample ways to customize your output with font families, fill patterns, type sizes, and border styles. *Presentation Maker* imports Lotus worksheets and outputs to both *Harvard Graphics* and various 35mm slide formats. List price: $49.95.

Reader service no. 636

Easy Working Spreadsheet

WINDOWS Longing for *Excel* but scared by its price? For much less money, you can create spreadsheets of up to 10,000 by 30,000 cells, open multiple spreadsheets at once, import and export *1-2-3* and ASCII files, sort data, do extensive formatting, and perform over 40 mathematical, statistical, financial, and date functions. You can't create macros, and the charts are all monochrome, but you can't expect everything at this price. One nice touch: Both the spreadsheet and charting module are OLE servers, so you can embed worksheets and graphs in other *Windows* applications. List price: $49.95.

Reader service no. 637

Spinnaker Software, 617/494-1200, 617/494-1219 (fax).

—S. B. and S. D.

Preferred Stock For The Price Of Common.

*Depending on applications used, power management features selected, and peripherals attached. Terms: MasterCard, Visa, Discover and American Express accepted. No surcharge for credit card orders. Money orders, certified checks, personal checks accepted (allow ten days for processing). Company and institutional P.O.'s upon credit approval. ZDS resellers and distributors determine their own pricing which may be higher or lower than ZDS' Z■DIRECT price. Prices do not include applicable sales tax, shipping and handling. Government, Educational and Volume Purchase buyers please call for a quotation. Federal Government Sales please call 1-800-843-4131. 30-day money-back guarantee applies only when buying through Z■DIRECT. Excludes opened software and purchases which have been subject to abuse. Some models shown with optional accessories. Most notebooks include one-year limited mail-back warranty with optional Z■CARE service available (call, or see a Z■CARE contract for important details). Order by FAX 1-800-472-7211. All products subject to availability. Specification and prices subject to change without notice. Zenith Data Systems is not responsible for typographical or photographic errors. Z■NOTE, Z■SPORT and READYDESK are trademarks of Zenith Data Systems Corporation. MS-DOS and Microsoft are registered trademarks and Microsoft Windows, Microsoft LAN Manager and Microsoft Windows for Workgroups are trademarks of Microsoft Corporation. i386, i486 and the Intel Inside logo are trademarks of the Intel Corporation. Novell and NetWare are registered trademarks of Novell, Inc. Banyan and VINES are registered trademarks of Banyan Systems, Inc. Copyright © 1993 Zenith Data Systems Corporation.

ZDS▪600 Series

FROM $1299 i386™SL/20-25 MHz • 60-120MB HDD • 3.5″ FDD • 2MB RAM user expandable to 8MB • 9.5″ VGA display • MS-DOS® 5.0 • serial, enhanced parallel, video, mouse/keyboard port • internal modem socket • up to 3 hours NiCad battery life • 6.5 lbs.

Z▪SPORT™ 325S

SAVE $200 i386SX/25 MHz • 60MB HDD • 3.5″ FDD • 2MB RAM user expandable to 8MB • 9.5″ edge-lit LCD • MS-DOS 5.0 • NiMH battery • optional ISA docking unit • serial, parallel, mouse, video port • 6 lbs.

Z▪SPORT 420S

SAVE $200 i486™SX/20 MHz • 85MB HDD • 3.5″ FDD • 4MB RAM user expandable to 16MB • 9.5″ edge-lit LCD • MS-DOS 5.0 • NiMH battery • optional ISA docking unit • serial, parallel, mouse, video port • 6 lbs.

Z▪NOTE™ 325L

SAVE $400 i386SL/25 MHz upgradable to i486SL • 85MB HDD • 3.5″ FDD • mouse • 4MB RAM user expandable to 12MB • 9.5″ LCD upgradable to color • MS-DOS 5.0, Microsoft® Windows™ 3.1, and Microsoft Windows for Workgroups™ • Ethernet compatible high-speed-communications port • pre-installed client software for Novell® NetWare,® Microsoft LAN Manager™ and Banyan® VINES,® • up to 10 hours NiMH battery life* • optional READYDESK™ Port Replicator • 5.9 lbs.

Z▪NOTE 325Lc

SAVE $500 i386SL/25 MHz upgradable to i486SL • 120MB HDD • 3.5″ FDD • mouse • 4MB RAM user expandable to 12MB • 8.4″ active-matrix color display • MS-DOS 5.0, Microsoft Windows 3.1, and Microsoft Windows for Workgroups • Ethernet compatible high-speed-communications port • pre-installed client software for Novell NetWare, Microsoft LAN Manager and Banyan VINES • up to 6.5 hours NiMH battery life* • optional READYDESK Port Replicator • 6.5 lbs.

Introducing new Z▪DIRECT pricing, starting at $1299. At Zenith Data Systems, we set the standard for notebooks others can only aspire to. Now, we pledge you our entire line of ZDS notebooks at rock-bottom low prices. From our light-weight, entry-level ZDS▪600 Series starting at $1299, to our upgradable Z▪SPORT notebooks with desktop expansion and our award-winning Z▪NOTEs with upgradable display, built-in networking and industry-leading battery life. So, for jackpot notebook quality at anybody-can-play prices, call Z▪DIRECT today. Or see your nearest reseller.

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Call Z▪DIRECT At 1-800-582-8193.

ZENITH DATA SYSTEMS

A Bull Company

Thinking Ahead.

Circle 240 on reader service card

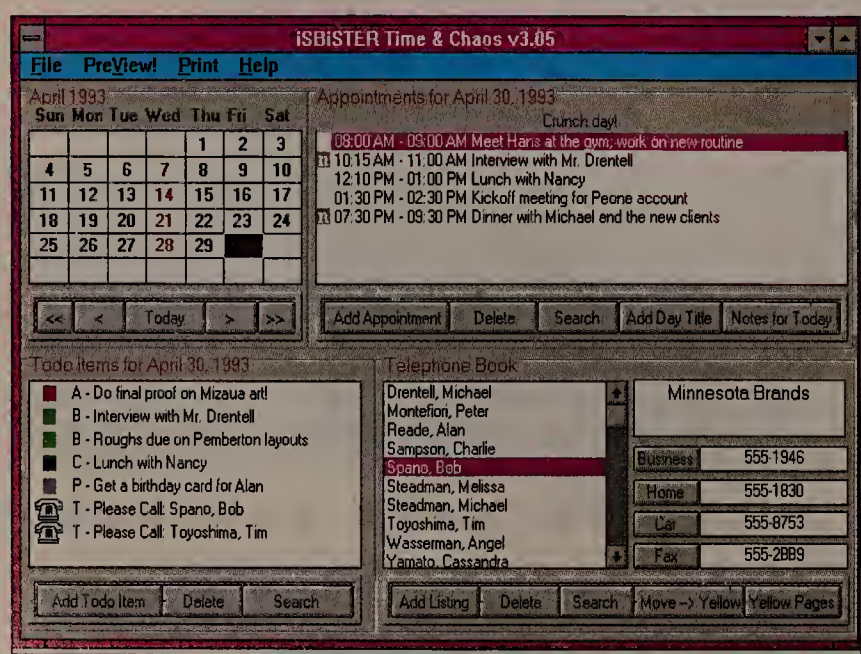
gram offers conflict checking, alarms, attached memos, and rescheduling features. It also has to-do list management that will automatically roll over and age items on the list. The program, mouse friendly and with movable windows, gives you a quick view of your weekly, monthly, and yearly schedules along with access to appointment details. *Any Time* supports over 500 printers and outputs a variety of schedules and calendars, including formats for Day Runner, Day-Timer, and others. There's even a full-screen print preview. *Any Time* lists for $59.95, but I've found it discounted to $39.95 at major retail outlets. Individual Software, 800/822-3522, 510/734-6767, 510/734-8337 (fax). —*S. B.*

Reader service no. 619

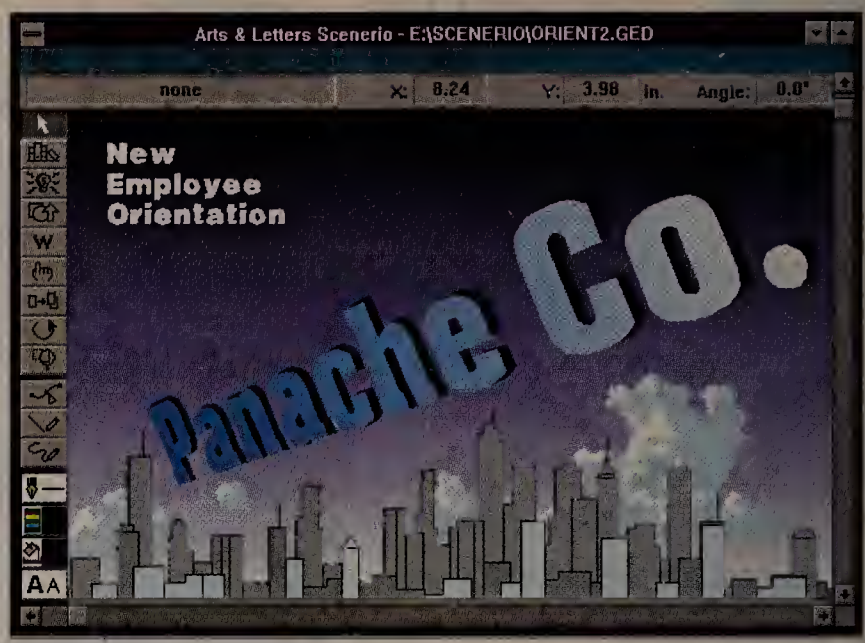
Time & Chaos 3.05

WINDOWS ✔SHAREWARE *Time & Chaos* is what a personal information manager should be: clean and simple. The main window is divided into four integrated sections: calendar, appointment list, to-do list, and telephone book. Anything you enter in the appointment list shows up in the calendar's preview mode. You can schedule single, daily, weekly, biweekly, and monthly appointments, with warnings if conflicts occur. The telephone book has lots of options, including sections for white and yellow pages, business and residence addresses, up to four phone numbers per entry, a pop-up module for note taking, links to the to-do list, and buttons for printing an envelope or launching your favorite word processor with the name and address automatically inserted in a new document. The application also gives you numerous options for printing calendars and phone and address lists. Available as TCHAOS-.ZIP on PC World Online and other on-line services. Registration fee: $24.95. iSBiSTER Int'l, 214/530-2762 (BBS). —*S. D.*

Reader service no. 620



PERSONAL INFORMATION MANAGEMENT is quick and easy with Time & Chaos, an inexpensive shareware program.



DRAWING FOR $29.95? Arts & Letters Scenerio offers many useful graphics tools at a remarkable price.

Publishing and Presentations

Arts & Letters Scenerio

WINDOWS Many working folk need occasional graphics but don't have the time or money for a high-end graphics package (to say nothing of hiring a full-time artist). For them the choice is simple: Use *Arts & Letters Scenerio*, a low-cost, one-shot solution for desktop publishing and presentation graphics. This vector-based system comes with over 200 canned shapes—including symbols, text effects, and clip art—plus the tools to turn them into what you need. You can also draw from scratch with the line, freehand, Bézier curve, and text tools; color your lines and fills; and even add gradients. Screen redraw on some gradients is slow, but you can interrupt the process to do other chores if you wish. List price: $29.95. Computer Support Corp., 214/661-8960, 214/661-5429 (fax). —*S. D.*

Reader service no. 621

CardsNow

Admit it, you've always wanted business cards, but you just don't want to go to all the expense and the bother of hiring a designer and then schlepping everything over to the print shop. With *CardsNow* and a laser printer, you can create new business cards without ever having to leave your office. *CardsNow* guides you through entering your copy and lets you choose from four type sizes and five styles. The program includes clip art and can import PCX files—if you can scan in your logo, you can put it on your business card. You also get enough sheets of preformatted white card stock to print 250 cards. List price: $39. Topitzes & Associates, 608/273-4300, 608/273-8804 (fax). —*S. B.*

Reader service no. 622

Path Search

FREE

***Path Search* is a handy program that finds any file in any directory in your PATH or in a list of directories that you create separately. Let's say you've got too many install programs scattered throughout your disk; just type PS INSTALL.* PATH and you'll find out where those files are—at least you'll find the ones on your PATH that you keep running accidentally. Available as PS.ZIP on PC World Online and other on-line services. —S. B.**

Paint Shop Pro 1.02

WINDOWS ✔SHAREWARE Navigating the seas of bit-map formats can be a pain. If you don't need the fine-tuning control of a fancy paint program or photo editor, save your money and buy *Paint Shop Pro*. This program lets you convert between many popular bit-map formats (BMP, DIB,

KwikDraw 1.31

FREE

WINDOWS **With *KwikDraw*, you don't need to pay money for a vector-based draw program. This handy little application provides tools for simple shapes and lines; five zoom levels; and a user-definable "magnetic" grid to help you align objects (sorry, no gradients or Bézier curves). If you need to work with more than 32 objects, you can always shell out $37.95 for the shareware version. Available as KDRAW3.ZIP on PC World Online and other on-line services. —S. D.**

RLE, GIF, IMG, JAS, MAC, MSP, PCX, PIC, RAS, TGA, TIFF, and WPG), adjust the color level, and crop and resize bitmapped images. Although there are no tools for painting or retouching portions of an image, you can make a number of image-wide adjustments, including sharpening, softening, and embossing, flipping, mirroring, and rotating. The program includes multiple levels of zoom and a very fast screen capture feature. Available as PSP.ZIP on PC World Online and other on-line services. Registration fee: $49. JASC, Inc., 612/934-7117. —*S. D.*

Reader service no. 623

Print Shop Deluxe

When you need to cook up a party invitation or a poster for your spring yard sale, *Ventura Publisher* may be a bit much. At those times, try Broderbund's *Print Shop Deluxe*, a program that lets you combine text and graphics to create signs, stationery, cards, banners, and other designs. *Print Shop* is amazingly easy to use: It includes full-page layouts to get the job done instantly and tools that let you design your own page, choosing from over 300 graphics, 100 backdrops and borders, and 30 scalable fonts. Once you've created a document, you can customize the look of it by shrinking, enlarging, stretching, or rotating the text or graphic. Want more? Change the headline text by adding shadows or graduated fills. And *Print Shop Deluxe* lets you see what you're doing as you go along. In fact, the hardest part is to stop using it. *Print Shop Deluxe* retails for $59.95, but I've seen it for as little as $47 at discount stores. Broderbund Software, 415/382-4400, 415/382-4419 (fax). —*S. B.*

Reader service no. 624

Lecture for Windows 1.02

WINDOWS ✔SHAREWARE If you need to whip up a monitor-based presentation and don't mind wrangling with command syntax and style names, *Lecture for Windows* might be just the tool you're looking for. You won't find data charts or drawing tools; instead, *Lecture for Windows* turns any text file into a series of handsome word chart slides. You create your show in Notepad or another text editor, specifying colors, fonts, and special effects (*Lecture*'s limited repertoire includes pop-up messages, zooming, and minimizing windows). When you run your script through *Lecture*, you can flip through slides manually or have them advance at specified intervals, in either one pass or a continuous loop. You can display your presentations in a full-screen window, although you'll still see the *Lecture* title and menu bars at the top. Available as LECTUR.ZIP on PC World Online and other on-line services. Registration fee: $29. Barn Owl Software, 618/632-7345, 618/632-2339 (fax). —*S. D.*

Reader service no. 625

MediaClips

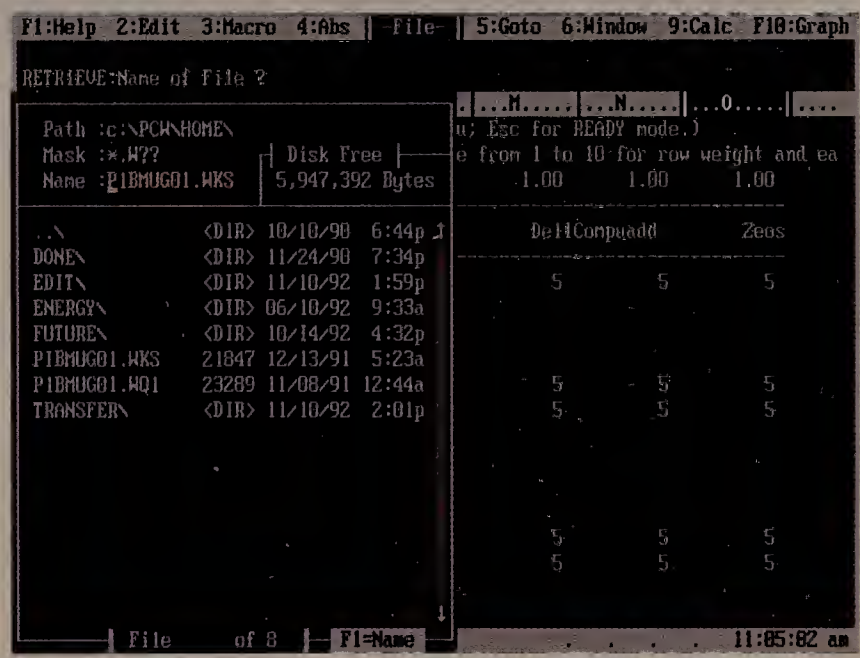
WINDOWS Looking for a cheap and easy way to dress up your reports and presentations with vivid pictures and sound clips? Look no further than the *MediaClips* series from Aris Entertainment. These CD ROM titles are clip art for the multimedia age, containing a wealth of 8- and 24-bit (256- and 16.8 million–color) photographs and sound files. Topics range from business (*Business Backgrounds* and *Money, Money, Money*) to scenery (*Majestic Places, Wild-Places*), with most titles going for $40 each. Your best buy: the $14.95 *MPC Wizard* disk, featuring a utility for testing and tuning a multimedia PC as well as sample sounds, along with a selection of images from the other titles. List prices vary. Aris Entertainment, 503/488-4864, 503/488-2321 (fax). —*S. D.*

Reader service no. 626

Spreadsheets

Alite 1.1

✔SHAREWARE Okay, so you'd like to have a spreadsheet around, but it's not a major part of your software arsenal. Or maybe you need a small one that'll fit on a floppy when you visit clients. *Alite* may be your answer; it weighs in at only $20 and a meager 256K (I didn't know *anyone* wrote programs that small nowadays). But *Alite* is no lightweight:



HAVE SOME TRAVELING WORKSHEETS? The $20 Alite can fit on a floppy and read and write 1-2-3 files.

It's compatible with *1-2-3* WKS and WK1 files, gives you 2048 rows by 128 columns, and has plenty of mathematical, logical, statistical, financial, and string functions. *Alite* also has a macro command language and five types of graphs. Available as ALITE1F.ZIP on PC World Online and other on-line services. Registration fee: $20. Trius, 508/794-9377, 508/688-6312 (fax), 508/794-0762 (BBS). —*S. B.*

Reader service no. 627

Text Editing

Boxer 4.0c

✔SHAREWARE Do you sometimes need to kick out a quick note or modify a batch file? If it's inconvenient to load your reg-

Shareware on Line

If you've never tried shareware, you're in for a treat. Instead of marketing through traditional distribution channels, shareware authors make their software available on a trial basis through electronic bulletin boards and mail-order companies. After you evaluate the program—usually about 30 days—the author expects you to send payment and register it, or stop using it and delete the files from your hard disk.

But Is It Safe?

First, a word about viruses: A lot of people worry about getting computer viruses from shareware. While there's some danger of picking up a virus that way, it's not overwhelming. Shareware distributors all scan their programs for viruses as a matter of course, but it wouldn't hurt to scan them again yourself. Then again, it's probably a good idea to scan new shrink-wrapped software as well, since viruses have been known to get into commercial software houses as readily as shareware ones.

For instant access to shareware, we've listed the more popular on-line services and BBS's across the country. You can access them with any modem. If you'd like to find all of the shareware and free programs discussed in this article in one place, check out PC World Online, where they're all kept together in the Featured In April folder.

Most of these files are available in the compressed ZIP format, and you'll need PKWare's *PKZIP* compression utility to unzip them. Any BBS that offers shareware will offer *PKZIP*, itself one of the most popular shareware programs of all time.

Unconnected Options

All's not lost if you're without a modem. Many shareware distribution companies will send you unregistered shareware, either on floppies or CD ROM, for a modest price (CDs tend to be more expensive but come with hundreds of programs). Just remember, when you "buy" shareware from one of these companies, you're paying only a distribution fee; you're still expected to register any program you decide to keep.

And don't forget your local user group. Many maintain shareware libraries, and larger groups obtain programs directly from the author. The neat part about user groups? You can usually get expert advice by talking with the shareware librarian. To find a user group near you, call the Association of Personal Computer User Groups' locator number, 914/876-6678, or check out *Consumer Watch* in the October 1992 issue of *PC World*.

Finally, you can get shareware directly from the authors, either by mail or through their BBS's. That way, you'll be sure to get the most current versions.

—S. B.

ON-LINE SERVICES AND BBS'S

America Online
703/448-8700, 800/827-6363 (membership)

Channel 1
617/354-8873 (BBS)

Cheers
814/539-6648 (BBS)

CompuServe
800/848-8199, 617/457-0802

Exec-PC
414/789-4210 (BBS)

Executive Network
914/667-4567 (BBS)

HH Info-Net
203/738-0342 (BBS)

PC World Online
PC World Online is a part of America Online; 800/827-6363 (membership)

SHAREWARE DISTRIBUTORS

EMS
301/924-3594, 301/963-2708 (fax)

PC-SIG
800/245-6717, 408/730-9291, 408/730-2107 (fax)

Public Brand Software (PBS)
800/426-3475, 317/856-7571

Public Software Library (PsL)
800/242-4775

Software Excitement
800/444-5457, 503/826-6884, 503/826-8090 (fax)

ular word processor, consider *Boxer*. This text editor is small and quick, yet it's amazingly functional (and believe me, I've used some dysfunctional ones). *Boxer* has most everything you'll need: full mouse support, multiple levels of undo, macros, forward and backward searches with wild cards, and word wrap. If you're doing any programming—or even just editing batch files—you'll appreciate the pop-up ASCII table, the graphic drawing, and the slick feature that matches parentheses. The keyboard can be easily reconfigured to emulate *WordStar* and *WordPerfect* keystrokes. *Boxer* is available as BOX400.ZIP on PC World Online and other on-line services. Registration fee: $35. Boxer Software, 800/982-6937, 603/924-6602. —*S. B.*

Reader service no. 628

Mega Edit 2.07

WINDOWS ✓SHAREWARE Tired of Notepad's measly file size limit and lack of basic features? Step up to *Mega Edit*, a robust text editor for *Windows* whose file size is limited only by your available RAM. *Mega Edit* lets you open and export DOS, Macintosh, and UNIX text files and can view (but not change) binary files. It has a full-featured search-and-replace capability and even the option to jump to the line number of your choice. Although you can open multiple documents at once, you can view and edit only two of them (or two places in one document) simultaneously; if you need to work on more than two text files at once, you must launch multiple instances of *Mega Edit*, just as you would with Notepad. Available as MEGAED.ZIP on PC World Online and other on-line services. Registration fee: $35.50. Computer Witchcraft, 415/752-2477, 415/752-8971 (fax). —*S. D.*

Reader service no. 629

Utilities

Disk Optimizer Tools 4.05

Every hard disk eventually has problems, and SoftLogic's collection of 17 utilities offers solutions to many of them. To begin with, you should let *Disk Optimizer Tools* defrag your hard disk regularly to ensure peak performance. Every so often, run REFRESH to give your disk the once-over and identify and exclude bad sectors. Data Guardian enables you to recover any delet-

ed files, and VITALSAV protects your disk from accidental formatting. If you need to delete a file so no one, not even someone with a copy of Data Guardian, can undelete it, you can use the KILLFILE program. List price: $49.95. SoftLogic Solutions, 800/272-9900, 603/627-9900, 603/627-9610 (fax). —*S. B.*

Reader service no. 630

hDC Power Toolboxes 1.0

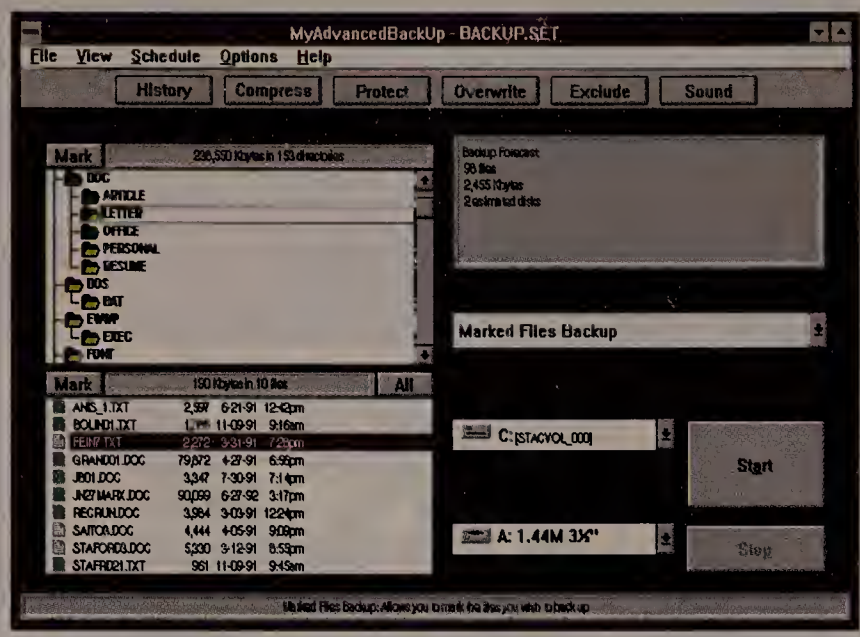
WINDOWS These days toolboxes—floating, icon-studded button palettes—are all the rage. One of the best and cheapest is hDC's *Power Toolboxes*. A subset of the company's *Power Launcher* product, *Power Toolboxes* sports a colorful combination of global and application-specific buttons. The program ships with macros for some 42 *Windows* applications, and you can create your own by either recording actions or writing instructions by hand. *Toolboxes* also lets you modify the size, number, position, and icon graphics of the buttons. The skimpy eight-page documentation isn't much help, but analyzing the examples and consulting the on-line help will usually suffice. *hDC Power Toolboxes*, which costs $39.95, is available only directly from hDC Computer Corp., 800/365-8553. —*S. D.*

Reader service no. 631

MyAdvancedBackUp for Windows 1.01

WINDOWS This long-named program offers most of the basics of a good *Windows* backup program at an excellent price. You can back up entire drives or partitions, or selected files or directories, or save only those files that have changed since the last backup. The program can ignore hidden or system files that never change or shouldn't be backed up (such as your permanent swap file). The scheduling and unattended background-backup features are especially useful for those backing up to a network server. Unfortunately, you can back up only to other hard drives or floppies—tape drives aren't supported. However, error correction, data verification, and data compression are. *MyAdvancedBackUp for Windows* lists for $59.95, but I found it for as little as $39.99. MySoftware Co., 415/325-9372, 425/325-3106. —*S. D.*

Reader service no. 632



IF YOU'RE BACKING UP TO FLOPPIES, MySoftware's MyAdvanced-BackUp for Windows is a good cost-saving option.

Metz Task Manager 2.0

WINDOWS SHAREWARE This useful utility (available as shareware and commercially) replaces *Windows'* Task Manager and, optionally, Program Manager too. As easy to bring up as the standard Task Manager, *Metz* offers push-button launching of up to nine programs, menu access to Program Manager groups, a command line with a memory, instant access to Control Panel, and even a simple file management utility. Other features include a scheduler to launch programs at preset times when you're not around, and file and text searching. It can also switch between tasks. Available as MTM20.EXE on PC World Online and other on-line services. Registration fee and list price: $49.95. Metz Software, 206/641-4525, 206/644-6026 (fax). —*S. D.*

Reader service no. 633

Win Rx 1.0

WINDOWS Does the fear of insidious computer viruses keep you awake at night? *Win Rx* is cheap, but good, insurance. The program currently comes with definitions for 46 boot-sector and 865 file viruses, but it doesn't stop there. By scanning files for instructions typical of destructive viruses, *Win Rx* may even be able to find and destroy the new "polymorphic" Mutation Engine viruses (no, I wasn't willing to test it). The interface is simple and gives you the option to scan directories, files, or whole drives. You can even scan in the background while you work in other programs, or manually stop a scan if you change your mind. Upon completion, *Win Rx* launches your text editor with a full report. List price: $39. Trend Micro Devices, 800/228-5651, 310/328-5892 (fax). —*S. D.*

Reader service no. 634

Steve Bass and Scott Dunn are contributing editors for PC World. *They can be reached on PC World Online (see page 8 for more information).*

Find Directory

FREE

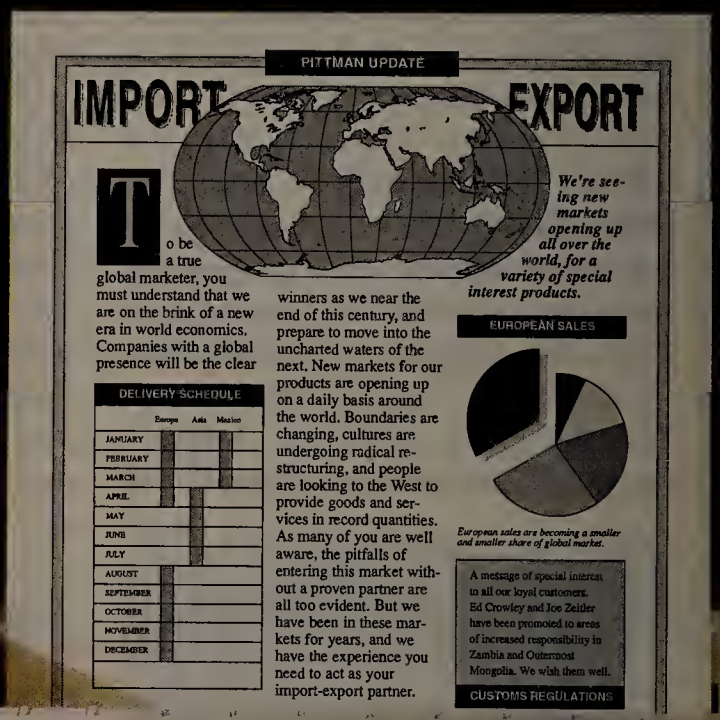
In DOS, moving from one directory to another is okay, but wandering through multiple subdirectory levels is a real pain. But not anymore. If you type just FD and a snippet of the directory's name, *Find Directory* will bring you there. Unlike Norton's similar NCD program, *Find Directory* does not need to keep a list on disk updated to work properly. *Find Directory* is available as FINDIR.ZIP on PC World Online and other on-line services. —S. B.

Filer 2.0

FREE

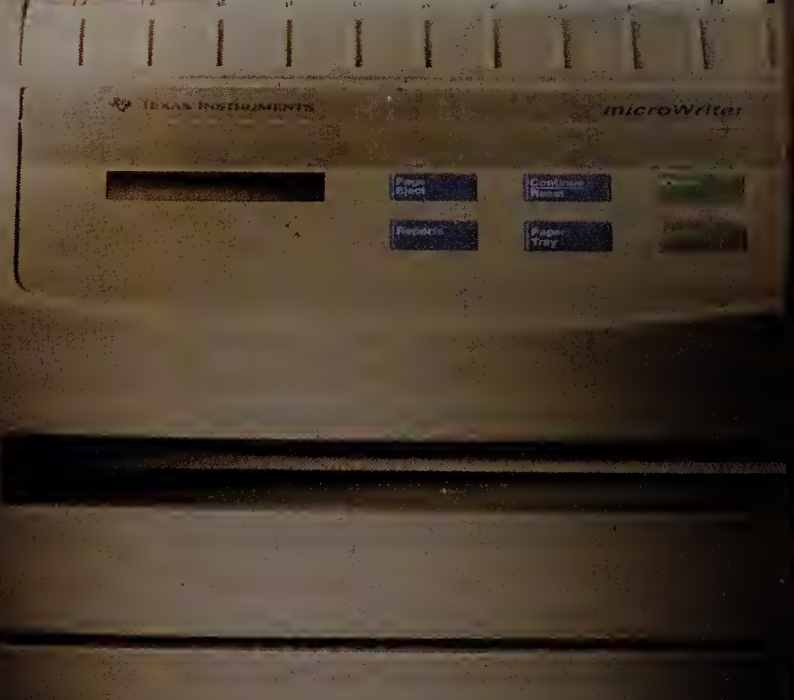
WINDOWS

Ososoft's *Filer* not only helps you find lost files but is a useful tool for keeping your disk in order. Using normal DOS wild cards, it searches for any file on any or all of your hard drives. You can print the resulting list or use it to delete, launch, or view selected files (in ASCII or a few graphics formats). Or you can narrow the search further by hunting for up to four text strings using Boolean AND/OR operators. After using it for a while, you'll have only one question: Why is anyone giving away software this good? Available as FILER2.ZIP on PC World Online and other on-line services. —S. D.



$1895*

HP's least expensive PostScript printer.



$999*

TI's least expensive PostScript printer.

*Suggested retail price. Dealer prices may vary. †Limited warranty, see dealer for details. Adobe PostScript and the PostScript logo are registered trademarks of Adobe Systems, Inc. LaserJet is a registered trademark of Hewlett-Packa Mac and AppleTalk are registered trademarks of Apple Computer, Inc. IBM is a registered trademark of International Business Machines Corp. microWriter is a trademark of Texas Instruments Incorporated. © 1993 TI.

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Software from Adobe

New TI microWriter

Not Only Is Ours About $900 Less, It's Also The Better Printer.

How is this possible? By using an innovative technology called LED, we've just developed the first Adobe PostScript™ printer with a list price under $1000. As you can see, the new TI microWriter™ PS17 delivers sharp laser-quality type and exceptional graphics. But at a much lower price than even the least expensive HP LaserJet® with PostScript. And that's just the beginning.

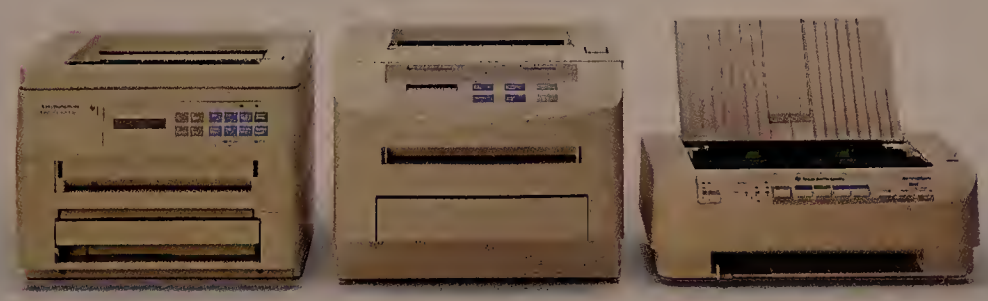
The microWriter is also faster. And since it has fewer moving parts, it's extremely reliable, so we give you a better warranty†. Paper handling is better, too. You can use up to three different paper trays.

The bottom line? No matter what business you're in, the better your work looks, the further you'll go. And no printer for the price can extend your reach further than a new TI microWriter.

For information and your nearest dealer, call *1-800-527-3500*.

	TI microWriter PS17 PostScript Printer w/ AppleTalk®	HP LaserJet IIP PostScript Printer w/ AppleTalk®
Pages Per Minute	*5*	*4*
Paper Handling	*(STD.) 250 Sheet Tray* *(OPT.) 250 Sheet Tray* *(OPT.) 150 Sheet Universal Feeder*	*(STD.) 50 Sheet Tray* *(OPT.) 250 Sheet Tray*
Mac®/IBM® compatible	*Standard*	*Standard*
Warranty	*1 yr., plus 5 yr. printhead*	*1 yr.*
Engine	*LED Electrophotographic*	*Laser Electrophotographic*

TI makes a full line of quality printers.



Coming Soon To A Dealer Near You.

EXTENDING YOUR REACH WITH INNOVATION

Texas Instruments

Circle 220 on reader service card

Windows Notebooks

for $2000 or Less

Sometimes you don't need a PC, but those times seem fewer and farther between. For your mobile computing pleasure, this review presents 20 affordable 386 notebooks–and some outstanding values.

With today's heavy workloads, fewer professionals can afford the luxury of turning off their computers at the end of the day and leaving their work behind. With notebooks at hand, PC users now work at home, out of town, and even during commutes.

The key to efficient computing on the go is desktop replacement: You need the power, memory, video, and disk capacity to run all of your applications—including *Windows* programs—on the six o'clock commuter special as well as in the office.

On the other hand, you don't want to break your budget on a second machine. So we cast our net wide for this review, seeking every affordable 386-or-better notebook we could get. We hauled in a mixed harvest, mostly composed of 25-MHz models using Intel's 386SL and 386SX and AMD's 386SXL CPUs, but we were even able to come up

By Rex Farrance and Owen Linderholm

STAN MUSILEK

with a couple low-priced Cyrix 486SLC-25s. (See "Mobile Computing Picks Up" for more inexpensive notebooks we couldn't get in time for review.)

Fortunately, prices have plummeted over the last several months. The Dell Dimension NL25, which earned a Best Buy in both this review and September's notebook roundup, cost $2746 last fall. But just six months later, its price had been slashed by almost $900 to $1848—and this kind of drop is the rule rather than the exception.

The average price of the notebooks in our roundup came to just over $1800 on the street—ready to travel, with at least 4MB of RAM, a 60MB hard disk, a 1.44MB internal floppy drive, a 2400-bps modem, DOS 5.0, *Windows 3.1*, and a mouse or trackball. Only 5 of 20 notebooks cost more than $2000, and one of those four, the Aspen Aquiline Personal 486, is a Cyrix 486SLC-25. The Arche NP-201 was the least expensive in our roundup, with a street price around $1500. News from the price front will continue to get better in the months to come, as competition forces 386 prices down even further.

Speed On the Go

As you might expect, the Cyrix 486SLCs were the fastest systems in our tests, although the speed differences between them and the fastest Intel 386SL systems were barely perceptible. While still capable, the AMD 386SXLs and Intel 386SXs formed a noticeably slower group. The 386SL chip's integrated memory cache controller gives it an edge over the AMD 386SXL. This feature makes it easy for motherboard manufacturers to add an external memory cache, and all the 386SL notebooks here provide one. With the AMD chip (or the Intel 386SX), motherboard manufacturers have to add a controller chip to support a cache—a problem considering the shortage of real estate on notebook motherboards. As a result, none of the 386SXL (or 386SX) models came with a RAM cache. The Cyrix 486SLC has an internal 1K memory cache integrated right into the chip.

To test these portables, the PC World Test Center used the same tough applications suite we regularly employ to benchmark desktop iron. It includes the PC World Test Center's *Windows 3.1* applications tests (*Freelance for Windows 1.0*, *Word for Windows 2.0*, *Excel 4.0*, and *Paradox 3.5* for DOS run from *Windows*). In addition, we run the BAPCo SYSmark92 test, which uses desktop publishing, presentation graphics, software development, spreadsheet, and word processing applications (for more details see the PC World Test Center Report).

Best Buys

Cutting the Cord

Some users will purchase a notebook to serve as a movable desktop they can easily tote from electrical outlet to electrical outlet. But for most buyers, battery life is crucial. To extend it, notebooks provide a variety of power-saving features. These include timeouts (for

Best Battery Life

With a range from under 2 hours to over 6 hours, battery life was a telling factor in this review. Nevertheless, most of these notebooks managed real-world battery life of close to or over 4 hours. The standouts are the top three with 6, 5½, and 5 hours, respectively. The Compudyne 386SL's 4 hours and 42 minutes is also good.

1. **ZDS 625nl Model 85** (page 139)
2. **Dell Dimension NL25** (page 131)
3. **Micro Express NP925** (page 132)
4. **Compudyne Slimline 386SL/25** (page 130)
5. **Swan 486/SLC-25** (page 138)

Best Price

Since we asked vendors to send our notebooks below a certain price, it isn't too surprising that there's little price variation in this review, except at the low end. Arche managed to send us a fully configured notebook for just over $1500, and the rest of our top five made it under $1700, with the Swan 386SX/25 just missing a Best Price spot at $1703.

1. **Arche NP-201** (page 119)
2. **Chaplet NBC 386SL-25** (page 126)
3. **CAF AquaLite-II** (page 126)
4. **Blackship BLK 386SL/25 NB** (page 126)
5. **Darius Professional Plus** (page 131)

In the end, there wasn't a huge value difference between the top notebooks in this review. The range from first to eleventh was relatively small and the six notebooks after our top five—the Micro Express, ZDS, Arche, Toshiba, BCC, and Swan 486/SLC-25—were only a few percentage points away from being Best Buys.

1. **AcerAnyWare V386SL** (page 118)
2. **Compudyne Slimline 386SL/25** (page 130)
3. **Compudyne Slimline 386SXL/25** (page 130)
4. **Dell Dimension NL25** (page 131)
5. **Compaq Contura 3/25 Model 84/w+** (page 127)

BEST BUY NOTEBOOKS, clockwise from the upper left: AcerAnyWare V386SL, Compudyne Slimline 386SL/25, Compudyne Slimline 386SXL/25, Compaq Contura 3/25, and Dell Dimension NL25.

example, turning off the hard disk or the screen's backlighting when it hasn't been used for a while) and default off settings (for the serial and parallel ports, for example), which require a software command to turn on. All these notebooks have a sleep or suspend mode that activates during work pauses to reduce CPU power consumption. When you wake your machine, it goes back to work right where you left off. In addition, many have a sophisticated feature that enables the CPU to doze between keystrokes.

Intel and Microsoft have cooperated in producing the Advanced Power Management (APM) specification, which promises to offer a greater level of power saving. Notebooks with this feature have an APM-compatible BIOS, *Windows 3.1*, and a special chip set to monitor system activity. Over half the notebooks here support the specification, but even with the *Windows 3.1* APM driver installed, we couldn't find a specific correlation between this feature and extended battery life in our user tests. We suspect that the full impact of APM won't be seen until applications such as *Excel* and *Quattro Pro* are rewritten to take advantage of the specification.

Battery life has a big effect on how long you can work before you have to plug back in. So the PC World Test Center tested each notebook's battery life by having human operators simulate work sessions. Our method fully tests all power-saving factors, including CPU timeouts between keystrokes and the effect of periodic saves.

With power saving set to a moderate level, actual battery life varied from a low of around 2 hours to a heady high of more than 6 hours—with more than half of the systems managing to run for about 4 hours. The Zenith Data Systems 625nl Model 85 kept computing for more than 6 hours, and the Best Buy Dell Dimension NL25 ran for more than 5½ hours. With these two notebooks and a half-dozen others (including the Best Buy Acer and Compaq models), you can swap a spent battery for a fresh one without having to quit your applications and power down.

All the systems reviewed except one use standard nickel-cadmium batteries; nickel metal-hydride batteries come with the Cube 325NTX Model 80 and are optional on the Compaq Contura 3/25 Model 84/w+. Nickel-cadmium batteries must be fully discharged frequently; otherwise, the power-management system will provide only the useful life equivalent to your last charges. This memory effect cuts deeply into the amount of time you can work with your notebook unplugged. You can however, top off nickel metal-hydride batteries before they run down without losing capacity. One of our notebooks, the AcerAnyWare V386SL, comes with an AC adapter designed to eliminate the nickel-cadmium memory effect.

Key Features

One of the biggest differences between a notebook and a standard PC is the keyboard. To fit the smaller form, manufacturers resort to nonstandard configurations and emulated keys that require you to hold down a special key to, for example, turn a cursor key into

Best Performance

Despite the different processors used in these notebooks, there wasn't much range at the top of the performance rankings. Eight systems were within 10 percent of a Best Performance spot, and even some of the slower AMD 386SXLs are in that group. After our top five, the next seven were the Dell, Acer, Chaplet, Blackship, CompuTrend, Toshiba, and CAF.

1. **Aspen Aquiline Personal 486** (page 120)
2. **Swan 486/SLC-25** (page 138)
3. **Compaq Contura 3/25 Model 84/w+** (page 127)
4. **Compudyne Slimline 386SL/25** (page 130)
5. **BCC SL325** (page 120)

Best Service and Support

Service and support is getting better and better; all of these companies provide adequate service policies. Indeed, with IBM and Compaq moving to three-year warranties, previous standard one-year warranties are starting to look a bit anemic. Even so, the differential in service and support is smaller than we've seen in the past.

1. **Compaq Contura 3/25 Model 84/w+** (page 127)
2. **Micro Express NP925** (page 132)
3. **CompuTrend Premio SL Notebook** (page 130)
4. **Toshiba Satellite T1850** (page 138)
5. **Aspen Aquiline Personal 486** (page 120)

<Page Up>. The fewer key emulations and the closer to standard the layout, the easier it is to go from keyboard to keyboard.

While we describe keyboard feel in the individual reviews, we'll leave you to decide what you like. Our battery testers also rated keyboards. They were unable to agree on the best keyboard feel and key travel. This area is definitely one of personal preference. Since the keyboard is your interface with the PC, it's always a good idea to tickle the keys before you commit to a final purchase.

Many of the notebooks featured fine keyboards, and all had the cursor keys configured in the standard inverted T. The Dell Dimension NL25's keyboard really stood out: It had no emulated page or function keys, and its large keys and intelligent layout made it a pleasure to use.

A Maze of Mouse Tracks

The notebooks took several approaches to mouse design, varying from built-in trackballs to clip-on trackballs to hand-held miniature trackballs to standard mice. Manufacturers located the built-in trackballs centrally above the keyboard, slightly to the left, all the way to the right, and in the lower-right corner. Aspen placed its Aquiline Personal 486's ball dead center on the front edge of the case. Mouse button placement was just as inconsistent; you have to use two hands to effectively operate the trackball on the Aspen and Cube models. And southpaws should note that placement is not always ideal for left-handed operators.

We asked for usability feedback from our team of ten battery testers, and we also formed our own opinions. We all preferred the standard mouse—as provided with the Best Buy Dell Dimension NL25—when we had the luxury of working at a desk. In the tight quarters typical of a commuter train, however, we preferred the large clip-on trackballs that came with two of our Best Buys, the AcerAnyWare V386SL and Compaq Contura 3/25 Model 84/w+. For open-the-case-and-work convenience, however, it's hard to beat the built-in trackball on the Best Buy Compudyne Slimline 386SL/25 and 386SXL/25 models.

Memory and Storage

While all the notebooks in our review come with at least 4MB of memory, if you're a *Windows* power user, you will want to push that up to at least 6MB. All the systems here allow at least that much memory expansion, except for the Aspen Aquiline Personal 486, which draws the line at 5MB. Two of our Best Buys, the AcerAnyWare V386SL and the Compaq Contura 3/25 Model 84/w+, give you a roomy 12MB memory ceiling, and the Cube 325NTX Model 80 lets you grow to 16MB of RAM.

Vendors sent us notebooks with hard disks ranging from 60MB to 120MB, with the latter representing the largest notebook option now available. If you're planning to use a lot of *Windows* applications, you should buy a notebook with the largest hard disk you can get. If you really need the space, you can also use a real-time compression utility such as *Stacker* or *SuperStor*.

Expandable Notebooks

PCMCIA slots add a new dimension to notebook expandability and a great deal to the capabilities of any notebook that has one. You can use these connectors to plug in any number of options, including flash memory cards, modems, LAN interfaces, and even removable hard disks. While the AcerAnyWare V386SL is the only notebook here that has one of these connectors, you'll be seeing more and more PCMCIA slots on notebooks in the near future.

With power saving set to a moderate level, actual battery life varied from around 2 hours to a heady high of more than 6 hours—with more than half the systems managing to run for about 4 hours.

The ultimate expandability option for a notebook PC that you'll be pressing into service in your office is a docking station. They usually come with one or more 8/16-bit expansion slots and a charger. And some even include desktop benefits such as a SCSI host adapter and drive bays. The Best Buy AcerAnyWare, the Aspen Aquiline Personal 486, and two Best Buy Compudyne models all offer optional docking stations.

Painless Portability

Our research tells us that the size and weight of a notebook, while important, is not an overwhelming factor in your buying decisions. The heaviest notebook in our review, the Toshiba Satellite T1850, weighs less than 9 pounds ready to travel with modem, AC adapter, and pointing device. The lightest systems were the Cube 325NTX Model 80 and the Chaplet-manufactured Blackship, Chaplet, and CompuTrend, which tipped the scale at just over 6½ pounds. The notebooks made by Chaplet were the smallest as well as the lightest, but even the Aspen and Toshiba, the biggest models overall, had footprints that were slightly larger than the tiny Chaplet's. The

AcerAnyWare V386SL

VITAL STATISTICS

Street price: $2073
Processor: Intel 386SL-25
PROS: Excellent keyboard, 120MB hard disk, 12MB RAM capacity
CONS: Price over $2000
Contact: Acer America, 800/733-2237, 408/432-6200
Reader service no. 667

The AcerAnyWare V386SL provides everything you've told us you want most in a notebook: low price, good speed, high portability, long battery life, and a good keyboard and screen. This system, with its 25-MHz Intel 386SL processor and 64K external memory cache, is a solid performer, just missing the top third overall and placing fifth on the graphics-intensive *Freelance* test. Battery life is respectable at over 3½ hours, and you can put in a fresh battery without shutting down your applications. APM support should translate into even better battery life when APM applications become available. To make this notebook even more attrac-

Micro Express NP925 had the largest footprint, about an inch longer and wider than the Chaplet models.

Getting the Picture

We found the display quality and screen size remarkably consistent among the products. All the screens display either 32 or 64 shades of gray, and all are monochrome VGA with backlit or sidelit LCDs. While there are minor variations in screen size, we were unable to perceive much differences in either apparent size or image quality. We did notice a lot of differences in screen adjustment, and we noted them in the individual reviews.

If you are running a demonstration, or if you're using your notebook as a desktop replacement, you may want to hook up to an external monitor for color output and a larger display. Almost half the notebooks in our roundup also let you feed 1024-by-768 output to a super-VGA monitor. And nine notebooks let you output simultaneously to your LCD screen and an external monitor, a real help when you're running a demonstration and it's hard for you to see the external display.

Service With a Smile

You get a tech support line and at least a 12-month warranty with all these notebooks; only Arche, CAF, and Chaplet make you pay the toll. Unlike standard PCs, where a repair can often be effected by swapping out, say, a defective expansion card, notebook breakdowns usually require replacement or shipment to a service center. On-site providers typically try to recover your data and usually give you a replacement notebook. Four notebooks in this review come with free or low-cost on-site service or replacement. But your primary concern with notebook service is quick repair turnaround, whether through on-site service or express delivery.

Length of protection matters too, and Compaq's 36-month warranty is the best you can get. Because of its new support policies, Compaq netted the finest overall service score.

The Prime Picks

After we tested them, carried them around, and wrote this article on them, we selected our five Best Buys. The AcerAnyWare V386SL's superb expandability and design earned it top billing. Fine battery life and expandability brought Compudyne's Slimline 386SL/25 and 386SXL/25 in next, with the 386SL/25 boasting excellent speed. The Dell Dimension NL25 has a balance of solid performance, great battery life, and our vote for best screen and keyboard. Finally, the Compaq Contura 3/25 Model 84/w+'s speed rivaled the two 486SLCs, and Compaq rated tops in service and support.

When you live with 20 notebooks for a month, you get to know them pretty well. And we felt as comfortable task-switching with *Windows* on the subway as we did exchanging E-mail from our kitchen tables. You can go out and buy a *loaded* 33-MHz 486DX desktop system right now for $2000 or less. At the same price, these notebooks are the state of the art in portables. A $2000 notebook doesn't give you a color display or a 250MB hard disk, but the next time the boss stops by at 5:55 demanding your report by 9:00 the next morning, you'll know they're worth it.

Rex Farrance is an assistant editor and Owen Linderholm a senior editor at PC World. *They can be reached on PC World Online (see page 8 for more information). Dawn Furseth, John Goddard, and Anita Hamilton contributed research.*

For more information about all products in this article, circle reader service no. 903.

tive, Acer incorporates new charger technology it promises will obviate the memory effect with its nickel-cadmium batteries.

The $2073 price is not the lowest you can find, but you do get a big 120MB hard disk for your money. Furthermore, this system has the best expandability in our review. This is the only notebook in our roundup that has a PCMCIA slot, and Acer provided a PCMCIA modem (reflected in price) to fit. You can also use the slot to connect to a range of peripherals, such as flash memory cards, LAN interfaces, or removable hard disks. The system can take up to 12MB of RAM. And for desktop-level expandability, Acer's optional expansion chassis includes a built-in charger, two 8/16-bit expansion slots, and a SCSI-2 interface.

This notebook won't put a big dent in your shoulder, either; its traveling weight is a reasonable 7 pounds, 12 ounces. We liked the keyboard. Its layout is logical, only <F11> and <F12> are emulated, and the keys have medium travel and minimal click. The easy-to-use Logitech external trackball clips on either side to accommodate right or left handers.

Acer doesn't give you on-site service, but the company does have an excellent 24-hour repair turnaround policy. Although the support technicians were a little slow responding to our calls on the toll-free line, their advice was sound. When we added Acer's hefty scores for design and expandability, we got the best overall rating of the 20 notebooks in this review, and Acer earned a blockbuster Best Buy.

Arche NP-201

VITAL STATISTICS

Street price: $1507
Processor: AMD 386SXL-25
PROS: Great price, 120MB hard disk
CONS: No toll-free support
Contact: Arche Technologies, 800/437-1688, 510/623-8100
Reader service no. 668

If you asked us what's attractive about the Arche NP-201, we would give you three answers: price, price, and price. Believe it or not, this AMD 386SXL-25 notebook has a street price of $1507! That would save you over $100 on the cost of the next cheapest system, the Chaplet NBC 386SL-25. And even at this low ante, Arche managed to deal out a 120MB hard disk with our test system. True, performance is just so-so, like the other AMD 386SXLs; the Arche lacks an external memory cache. But its super price hoists it up to eighth on our list of overall values.

The Arche NP-201 has decent battery life at around 3 hours. The

keyboard has a cushioned action, which is great if you want to take silent notes in a meeting. And the layout is terrific, with no emulated function or page-control keys. For a pointing device, Arche threw in a Keytronics serial mouse. That's ideal for working on the desktop, but not very practical on the armrest of an airline seat.

The documentation is outstanding, including photographs illustrating how to install such hardware as a modem or more RAM. We can't say as much for service and support, unfortunately: You pay the toll for technical support calls, there's no on-site service, and the company's four-day turnaround policy is the longest in our review. If your bottom line is based on price, however, Arche is the best bargain here and doesn't sacrifice performance.

Aspen Aquiline Personal 486

VITAL STATISTICS

Direct price: $2270
Processor: Cyrix 486SLC-25
PROS: Top performance, 120MB hard disk
CONS: Most expensive here, trackball requires two hands
Contact: Aspen Computer, 800/472-3273, 518/785-6517
Reader service no. 669

This large, black notebook has a cushioned finish that gives it a leatherlike elegance. On the other hand, the Aspen Aquiline Personal 486, at 8 pounds, 10 ounces, is the second heaviest system here. But this system will impress you with the outstanding speed of its 25-MHz Cyrix 486SLc processor. This notebook not only placed first in overall performance, it was tops on the *Word for Windows* test and BAPCo SYSmarks, and no lower than third on any single test. This performance doesn't come cheap, however—at $2270 direct, this is the most expensive notebook in our review. Fortunately, a 120MB hard disk softens the bite of the hefty price, as does a port for an optional scanner. In addition, you get a generous 12MB RAM limit. The extra storage and memory capacity could prove useful if you have reams of data.

Aspen provides a nice keyboard. It rivals the full travel, positive feel, and click of a Lexmark IBM PS/2 keyboard. You get all 12 function keys, although you have to put up with emulated page keys and an unusual trackball setup. The company had good intentions in placing the ball dead center on the front edge of the case, but the result is equally inconvenient for both left- and right-handers. To use it effectively for dragging or sizing, you have to lift both hands off the keyboard; one hand to click the buttons and the other hand to roll the ball.

The Aspen posted a respectable battery life of almost 3 hours. Its service rates as excellent, with an outstanding one-day turnaround policy and toll-free support including Saturdays. A heavyweight in more ways than one, the Aspen Aquiline Personal 486 will give you speed, speed, and more speed—and if you don't mind this system's extra cost and weight, it's worth considering. But you ean find good performance and much better expandability and portability among the members of our Best Buy list.

Austin 386/SXL-25

VITAL STATISTICS

Direct price: $1990
Processor: AMD 386SXL-25
PROS: Good battery life
CONS: Mediocre performance
Contact: Austin Computer Systems, 800/752-1577, 512/339-3500
Reader service no. 670

This nice-looking, dark-gray notebook is based on an AMD 386SXL-25 processor. Performance is its Achilles' heel; only three systems posted slower scores on overall performance. And while its $1990 price is reasonable, it's not outstanding considering that Austin included only a 60MB hard disk.

The keyboard has a positive feel, with the click and key travel comfortable to many desktop users. Unfortunately, you'll have to put up with some emulated page and function keys. The trackball, offset to the right at the rear of the keyboard and surrounded by four mouse buttons, is somewhat awkward to use, especially when you have to click and drag.

The Austin earned a good battery rating, running for almost 4 hours. Another weighty concern when you're out on the road is portability, and here the Austin also did commendably. At 7 pounds, 12 ounces, this system is easy to carry.

Service and support policies are good. Although there's no on-site service, the company promises to turn repairs around within two days. Toll-free technical support is available seven days a week, 24 hours a day. However, Austin's advice too often strayed away from the mark, and the company took longer than usual to respond to some of our support queries.

Though it doesn't stand out in any particular area, the Austin still rates as a solid middle-of-the-road value. If you want better performance, however, you can easily find it elsewhere.

BCC SL325

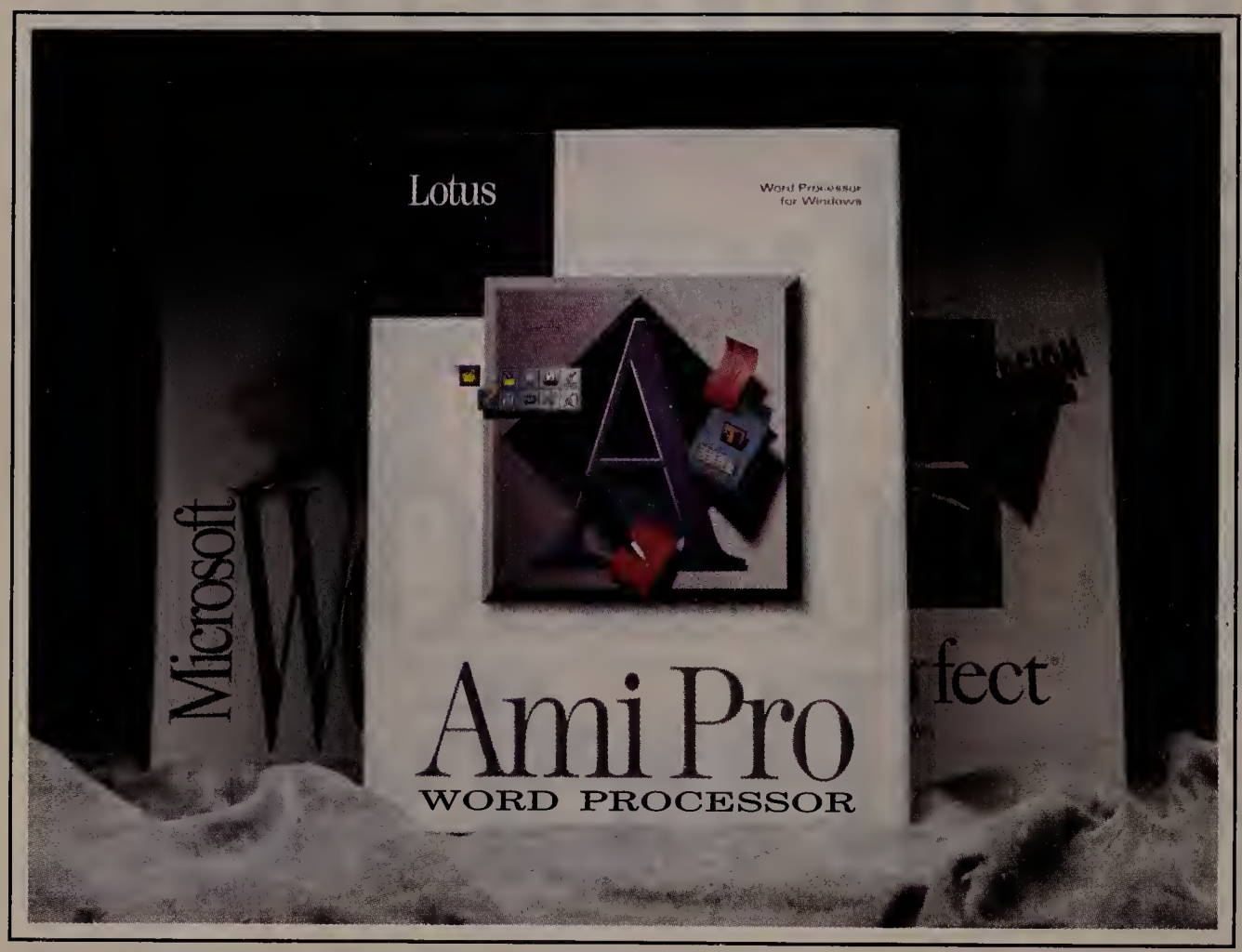
VITAL STATISTICS

Street price: $1895
Processor: Intel 386SL-25
PROS: Fast, good battery life, space-saving hinge
CONS: Special-function key awkward to reach
Contact: Beaver Computer, 800/827-4222, 408/944-9000
Reader service no. 671

This sleek black notebook was obviously designed with the air traveler in mind. The casing has a smooth, polished feel, while its unusual modified clamshell design is hinged to give you more space to tilt open the screen when you're working on a seat-

There's quite a battle raging between Word and WordPerfect.

For seco



In the War of the Words, there's one clear winner. Ami Pro.

Word vs. WordPerfect.® It's billed as the battle of the world's two greatest word processors. Hardly.

According to most independent judges, Lotus® Ami Pro® 3.0 is the clear and convincing leader of the word processing pack. Word and WordPerfect are following its lead, scrapping it out for second and third.

Check the rankings.

Ami Pro 3.0 is ranked the #1 Advanced Word Processor for Windows™ by the National Software Testing Laboratories. (9/92)†

Recently, in an InfoWorld review, Ami Pro received the highest score ever given for a Windows word processor. (9/28/92)

Lotus Ami Pro captured the 1992 PC Computing MVP Award. (12/92) (Note: The MVP award also appears in the new WordPerfect ad. That's last year's award.)

PC Magazine recently named Ami Pro one of the Best Products of 1992. They said, "No other product can match...the sheer pleasure of using it." Microsoft Word received an Honorable Mention, with the comment "...it's a step behind Ami Pro." (1/93)

Now, perhaps the battle royale between Word and WordPerfect has been put into perspective.

And you probably wonder what it is that makes Ami Pro clearly better?

†Among all word processors tested. Software Digest, Ratings Report, Vol. 9, #6, Sept. 92. Reprints available upon request. *On weekdays, plus 7AM to 4PM on Saturdays. **Offer expires 9/30/93. Call for a list of eligible word processo
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nd place.

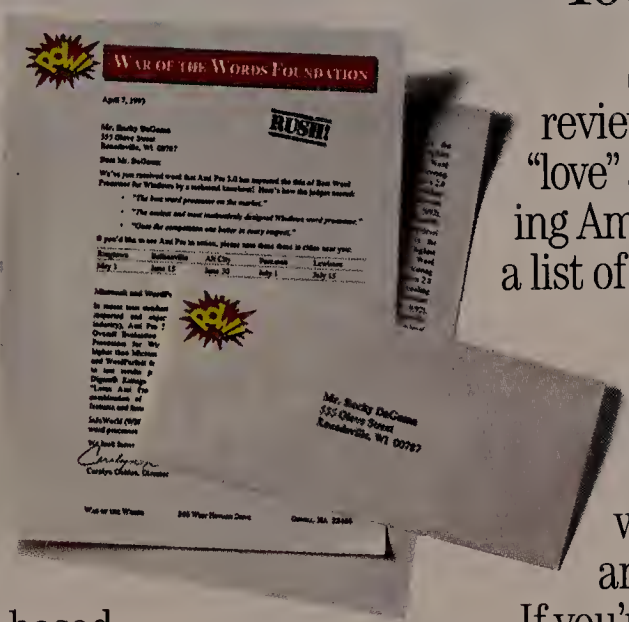
The battle of the features.

Simply put, Ami Pro is a faster, easier, friendlier word processor to use. It does so many things with so little effort, most people never even bother to open the manual.

To name a few, there's real, honest, no ifs-ands-or-buts WYSIWYG. There's Fast Format, for quick repetition of text formats. There are customizable, editable SmartIcons.™ Not to mention SmartClick, where the right mouse button will automatically shift you to the appropriate dialogue box to change fonts, styles or frame formats, based on what you're doing.

There's automatic renumbering of lists. Preview of Style Sheets. QuickStart on-line tutorial. Free 24 hour a day technical support.* And to ease your mind, a 60-day money back guarantee of your complete satisfaction.

And, if you're switching from WordPerfect for DOS, relax. Ami Pro makes it easy with a number of special features. Like seamless conversion of WordPerfect files. And a SwitchKit so that when you type in WordPerfect commands, Ami Pro shows you how to perform the same functions using pull-down menus or one-click SmartIcons.



You call the winner.

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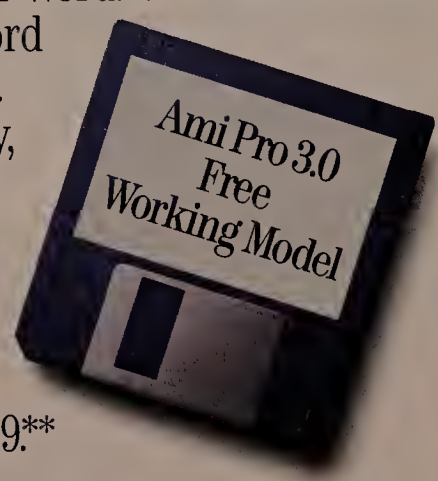

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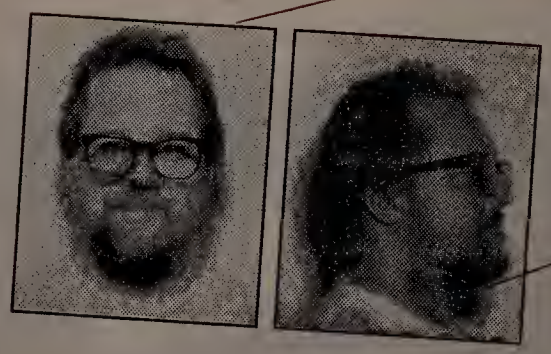

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The Crime
H.P. Lancaster, IV, is being sought for trying to pass 600-dpi resolution as camera-ready output.

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Age..... 53, born Dec. 2, 1939 Boise, Idaho

Height.... 5'8"

Weight....240 pounds

Build..... Square, boxy.

Remarks.. Wears prescription glasses, avid gun collector, drinks light beer, chronic gambler, and race track enthusiast; shops at tall and big men shops.

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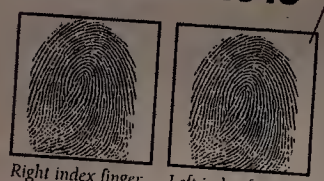

Right index finger Left index finger

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Windows PRINTERS	**Resolution**	**Max. Paper Size**	**Price**
WinPrinter 600XL	600 dpi	11" x 17"	$3695
WinPrinter 800	800 dpi	8.5" x 14"	$1095*
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[1]Upgrades an HP LaserJet 4. [2]Upgrades an HP LaserJet II, IID, III, IIID.

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Circle 137 on reader service card

back tray, even in cramped quarters. And the solid, 4-hour battery life is conducive to extended travel.

The system is based on an Intel 386SL-25 processor, and it comes with a 64K external memory cache. Its performance ranked an impressive fifth overall, and it was particularly speedy on our *Windows* test suite. It managed the second best score on the *Excel* test and third on both *Word for Windows* and the graphics-intensive *Freelance* test.

The keyboard has a nice medium travel and a slightly soft feel, but BCC chose to squeeze the special-function key down to half the size of the ordinary keys. You get all 12 regular function keys, but the page control keys are emulated. BCC provided an external Thumbelina trackball from Appoint, which is very portable but somewhat awkward to use. Our test panel had trouble getting used to this device, and so did we.

The BCC has a good price and good performance, plus a respectable 80MB hard disk, with a 120MB option available. Service and support is decent: There's no on-site service, BCC provides a three-day turnaround policy, and while support is toll free, it's unavailable on weekends. This system isn't at the very top of our list, but you might consider it if you spend a lot of time in the air. Otherwise, you'll find your best bets further up the list.

Mobile Computing Pace Picks Up

There are several other notebooks available for around $2000 or less that we were unable to get in time for this review. In addition, a multitude of products were announced at Fall Comdex a bit too late for inclusion. The most impressive newcomers are from AST, Gateway, Panasonic, and Texas Instruments. New products also emerged from Canon and Keydata.

The AST Power Exec EL is the latest version of the Power Exec 3/25SL. It now includes a removable, upgradable hard drive, a PCMCIA version 2.0 slot, and an optional expansion chassis. The Texas Instruments TravelMate WinSLC uses TI's own (Cyrix-designed) 486SLC-25 processor and has a great screen. A wide range of options is available with the TI, including LAN interface adapters, a SCSI module, and a high-speed internal fax-modem. The Panasonic CF-1000 is another intriguing model. It uses AMD's low-power AMD386SXLV-25 and you can exchange the floppy drive for an additional battery pack, doubling battery life. Panasonic claims up to an 11-hour battery life. Without modem and pointing device, it weighs 5 pounds, and an expansion chassis is also available.

The Canon Innova 386NX uses an AMD 386SX running at 33 MHz and is also offered in special bundles with portable versions of Canon's BubbleJet printers. The Keydata Keynote 486SLC-33 uses the fastest version available to date of the Cyrix SLC.

Gateway 2000 originally shipped us its AMD 386SXL-25–based Nomad 325SXL for this review. Gateway subsequently decided to replace the 325SXL with the Nomad 425SXL, which features a low-power-consumption version of the Intel 25-MHz 486SX processor. Although we were unable to get a unit in time to review the new system, its initial specs look attractive. It ships with 4MB of RAM, an 80MB hard disk, *Microsoft Works for Windows 2.0*, DOS, *Windows*, an external trackball, and a modem for around $2100.

Other Notebook Notables

Company	Product	Processor	Phone number
Altec Technology	Altec 486SLC Notebook	Cx486SLC-25	800/255-9971
AST Research	Power Exec EL	i386SL-25	800/876-4278
Aurum Computer	GoldNote 425SX/80	i486SX-25	800/552-8786
Canon Computer Systems	Innova 386NX	AMD386SX-33	800/848-4123
CompuAdd	CompuAdd 325tfx	i386SX-25	800/456-3116
CompuAdd Express	CompuAdd Express 425XL	Cx486SLC-25	800/925-3000
CompuTrend Systems	CompuTrend Premio 386SL-25	i386SL-25	800/677-6477
DEC	DECpc 320P Notebook	i386SX-20	800/332-4636
Eltech Research	Model 386NB25	AMD386SXL-25	800/358-8330
Epson America	Epson NB-SL/20	i386SL-20	800/922-8911
First Computer Systems	FCS 386-33DX Notebook	i386DX-33	800/325-4441
Gateway 2000	Nomad 425SXL	i486SX-25	800/846-2000
IBM	ThinkPad 300	i386SL-25	800/772-2227
Insight Computers	Insight 386SX-25 Notebook	i386SX-25	800/776-7600
Keydata Int'l	Keynote 486SLC-33	Cx486SLC-33	800/486-4800
Leading Edge Products	N3/SL25 Monochrome	i386SL-25	800/874-3340
NEC	UltraLite SL/20	i386SL-20	800/632-4636
Noteable Computer	Noteable N400 486SLC/25	Cx486SLC-25	800/274-4124
Packard Bell Electronics	PB 386SX25	i386SX-25	818/886-4600
Panasonic	CF-1000	AMD386SXLV-25	800/742-8086
PC Brand	PC Brand 486/SLC Monochrome LeaderBook	Cx486SLC-25	800/722-7263
Relisys	RN-6000	AMD386SXL-25	408/945-9000
Samsung Electronics	NoteMaster 486S/25N	Cx486SLC-25	800/446-0262
Sharp Electronics	PC-6781	i386SL-25	800/237-4277
Texas Instruments	TravelMate WinSLC	TI486SLC-25	800/527-3500
Twinhead	Slimnote 486SX/25	i486SX-25	800/995-8946
USA Flex	USA Flexnote 386SXL-25	AMD386SXL-25	800/872-3539
Zeos Int'l	Zeos Freestyle/SL	i386SL-25	800/423-5891

Blackship BLK 386SL/25 NB

VITAL STATISTICS

Direct price: $1649
Processor: Intel 386SL-25
PROS: Excellent price, superb portability
CONS: 2 hour battery life
Contact: Blackship Computer Systems, 800/531-7447, 408/432-7500
Reader service no. 672

The Blackship BLK 386SL/25 NB is one of three virtually identical notebooks in this review. The other two systems are also manufactured by Chaplet: the Chaplet NBC 386SL-25 and the CompuTrend Premio SL Notebook. Beneath their charcoal gray exteriors, these Intel 386SL-25 systems share some attractive characteristics.

For one thing, these machines take the portability crown hands down, with their trim dimensions and feather-light 6 pound, 10 ounce traveling weight. For another, their prices are among the best you'll find. At $1649, the BLK 386SL/25 NB is the fourth least expensive notebook in our roundup.

None of these Chaplet-made systems is a sterling performer. In fact they clustered together toward the bottom of the rankings of the 25-MHz 386SLs. Only the ZDS 625nl Model 85 ranked lower in this processor class. You can undoubtedly chalk up the Chaplets' mediocre speed rating to their 16K external memory cache—all the other SLs had 64K caches. Worse than the unimpressive performance, in our estimation, is the short 2-hour battery life, which is about as poor as you will find in this review. For a full 6 hours of work you'll need to drag around an extra two batteries, negating the system's weight advantages.

You get a decent-sized 80MB hard disk, and the Blackship keyboard has a nice, clicky feel. The dedicated page navigation keys are lined up on the right side of the keyboard, and only the <F11> and <F12> keys are emulated. The <Caps Lock> and <Tab> keys are quite small, but not so small that they interfere with effective touch typing. The recessed trackball is located on the upper right of the keyboard, with buttons on the right, hard to reach for left-handers. It was easy enough to move the cursor around on the screen, but the mouse button placement made it difficult to click and drag.

Service and support are adequate. The company provides a two-day service turnaround policy and toll-free technical support. The main drawbacks we found in Blackship's support policies were the lack of weekend support and some imperfect answers to our queries from the technical support staff.

The Blackship BLK notebook is only a midrange performer, but if you spend as much time as we do on the road, with a laptop hanging from your shoulder, you'll appreciate this system's light weight. And the Blackship's price is reasonable too. However, if you're looking for a bargain, the slightly slower AMD 386SXL Arche NP-201 costs well over $100 less, provides a 120MB hard disk, *and* gives you an extra hour of battery life.

CAF AquaLite-II

VITAL STATISTICS

Street price: $1638
Processor: AMD 386SXL-25
PROS: Very easy to carry, serviced by any CAF dealer
CONS: No toll-free support
Contact: CAF Technology, 818/369-3690, 818/369-3692 (fax)
Reader service no. 673

This notebook comes with a textured, charcoal gray finish and a distinctive appearance that belies its bargain price. At $1638 on the street, the CAF AquaLite-II is the third least-expensive PC here and the fastest AMD 386SXL-25 system. Still, this system was noticeably slower than our top Intel 386SL-25 contenders.

Generally, the CAF is quite a nice traveling companion, weighing in at a mere 7 pounds, 4 ounces. Battery life is decent at 3¼ hours, and you can put the system in suspend mode and swap in a new battery without powering down. Our AquaLite-II came with an 80MB hard disk, and there's a 120MB option as well.

We liked the keyboard, with the exception of the undersize <Tab> and <Backspace> keys. CAF provides an external Genius mouse, which would be great for desktop use, especially teamed with the optional numeric keypad. If you're augmenting the built-in screen with an external display, you can pipe out full SVGA output and simultaneously watch the display on the notebook's screen.

When it comes to service and support, you could do a lot better. The CAF AquaLite-II has no on-site service, you pay the toll on your technical support calls, there's no weekend support, and the turnaround policy is three days. CAF does offer one service advantage: If you have trouble on the road, you can take your notebook to any authorized dealer. Bargain hunters will be attracted to this trim little unit—it isn't a bad deal. But if our money were at stake, we'd pay another $200 for a Dell Dimension NL25.

Chaplet NBC 386SL-25

VITAL STATISTICS

Direct price: $1634
Processor: Intel 386SL-25
PROS: Excellent price
CONS: No toll-free support, 2-hour battery life
Contact: Chaplet Systems USA, 408/732-7950, 408/732-6050 (fax)
Reader service no. 674

The Chaplet NBC 386SL-25 is a dead ringer for the Blackship BLK 386SL/25 NB and the CompuTrend Premio SL Notebook—and for good reason. Chaplet manufactured all three models. You get the same tiny dimensions and light weight (6

pounds, 10 ounces) as with the other two Chaplets. But with its $1634 street price, the Chaplet NBC 386SL-25 is the least expensive of the three and is second only to the Arche NP-201 in our low-price sweepstakes.

All three of these look-alikes feature an 80MB hard disk. In addition, all three Chaplets had small 16K external RAM caches and slower performance scores than any other Intel 386SL system here except for the ZDS 625nl Model 85. And although this system's battery life was marginally better than the Blackship's, it was still way too short for our taste.

If you like a clicky keyboard, you'll enjoy the NBC 386SL-25. Unfortunately, the built-in trackball suffers, as did the Blackship's, from the awkward position of its control buttons.

The service doesn't match up to what CompuTrend and Blackship offer. There's no on-site service option like CompuTrend's, and you have to pay the toll on your service calls; Chaplet doesn't even provide a dedicated support line for its dealers. Chaplet's low price may attract you if you're looking for a lightweight bargain. But you can save over $100, get a bigger 120MB hard disk, and boost your battery life simply by buying the Arche NP-201 instead.

Compaq Contura 3/25 Model 84/w+

VITAL STATISTICS

Street price: $2170
Processor: Intel 386SL-25
PROS: Fast, great keyboard, three-year warranty, 12MB RAM capacity, very good battery life
CONS: Price over $2000
Contact: Compaq Computer, 800/345-1518, 713/370-0670
Reader service no. 675

Want the best service and support you can get on a fast, beautifully designed notebook? Look no further than the Best Buy Compaq Contura 3/25 Model 84/w+. Its stupendous three-year warranty is tops, and backed by a year of free on-site service and toll-free, 24-hour phone support. When we put tech support to the test, we got accurate advice and quick responses.

Compaq notebooks have a reputation for speed, and in this case it's well earned: The Contura is third fastest overall, and the two faster systems were both 486SLCs. At that, they barely edged out this speedy Intel 386SL. The Compaq came in third on BAPCo SYSmarks, third on the disk-intensive *Paradox* benchmark, and fourth on *Word for Windows*. This kind of performance and service protection doesn't come cheap, however: The Contura costs $2170 on the street with an 80MB hard disk.

The battery kept this average-size notebook running for a solid 4 hours, and with the auxiliary battery installed, you can put in a fresh power pack without shutting down. The keyboard is laid out reasonably well, but you'll have to put up with emulated page keys along with an emulated <F11> and <F12>. The feel is very stiff and positive, with hardly any key travel. It takes some getting used to, but that silent touch is really handy if you want to take notes without distracting Ms. or Mr. Big. The large, external, clip-on trackball is the next best thing to a standard mouse.

As with all Compaq computers, the documentation is super; it even gives you ergonomic advice. If you need to load up on memory, this system lets you have up to 12MB of RAM. Additional options include an external charger, nickel metal-hydride battery pack, and a car adapter. This high-class notebook might not please a bargain hunter, but great performance and unparalleled service and support made believers out of us. It thoroughly deserves a Best Buy award for its all-around merits.

Late List Prices

As we report in our review, competition from notebooks based on the new Intel 486SL CPU is causing vendors to offer better and better deals on their 386-based units. The average price drop over a two-month period was well in excess of $100, and the price on the Best Buy Compudyne Slimline 386SL/25 plunged by an impressive $400—making an already good deal a lot better. Two notebooks actually rose in price: The Swan 386SX/25 went up $10 to cover a change to a more expensive modem, and CAF implemented a procedural $5 increase. With aggressive pricing the rule on these affordable portables, don't be surprised if they become even less expensive in the months to come. All of the Best Buys, apart from the Dell Dimension NL25, dropped in price significantly, confirming their top ranking.

Notebook Prices Drop Steadily

	List price as of February 1993	Price change from December 1992
AcerAnyWare V386SL	$2298	$200
Arche NP-201	$2153	none
Aspen Aquiline Personal 486	$1995	$275
Austin 386/SXL-25	$1699	$291
BCC SL325	$1895	none
Blackship BLK 386SL/25 NB	$1545	$104
CAF AquaLite-II	$1979	$5[1]
Chaplet NBC 386SL-25	$1699	$270
Compaq Contura 3/25 Model 84/w+	$1910[2]	$260
Compudyne Slimline 386SL/25	$1827	$400
Compudyne Slimline 386SXL/25	$1727	$300
CompuTrend Premio SL Notebook	$1675	$10
Cube 325NTX Model 80	$1895	$100
Darius Professional Plus	$1699[2]	none
Dell Dimension NL25	$1848	none
Micro Express NP925	$2000	none
Swan 386SX/25	$1713	$10[1]
Swan 486/SLC-25	$1873	$80
Toshiba Satellite T1850	$1999	none
ZDS 625nl Model 85	$1499[2]	$359

[1] Price increase.
[2] Estimated street price; company does not publish list prices.

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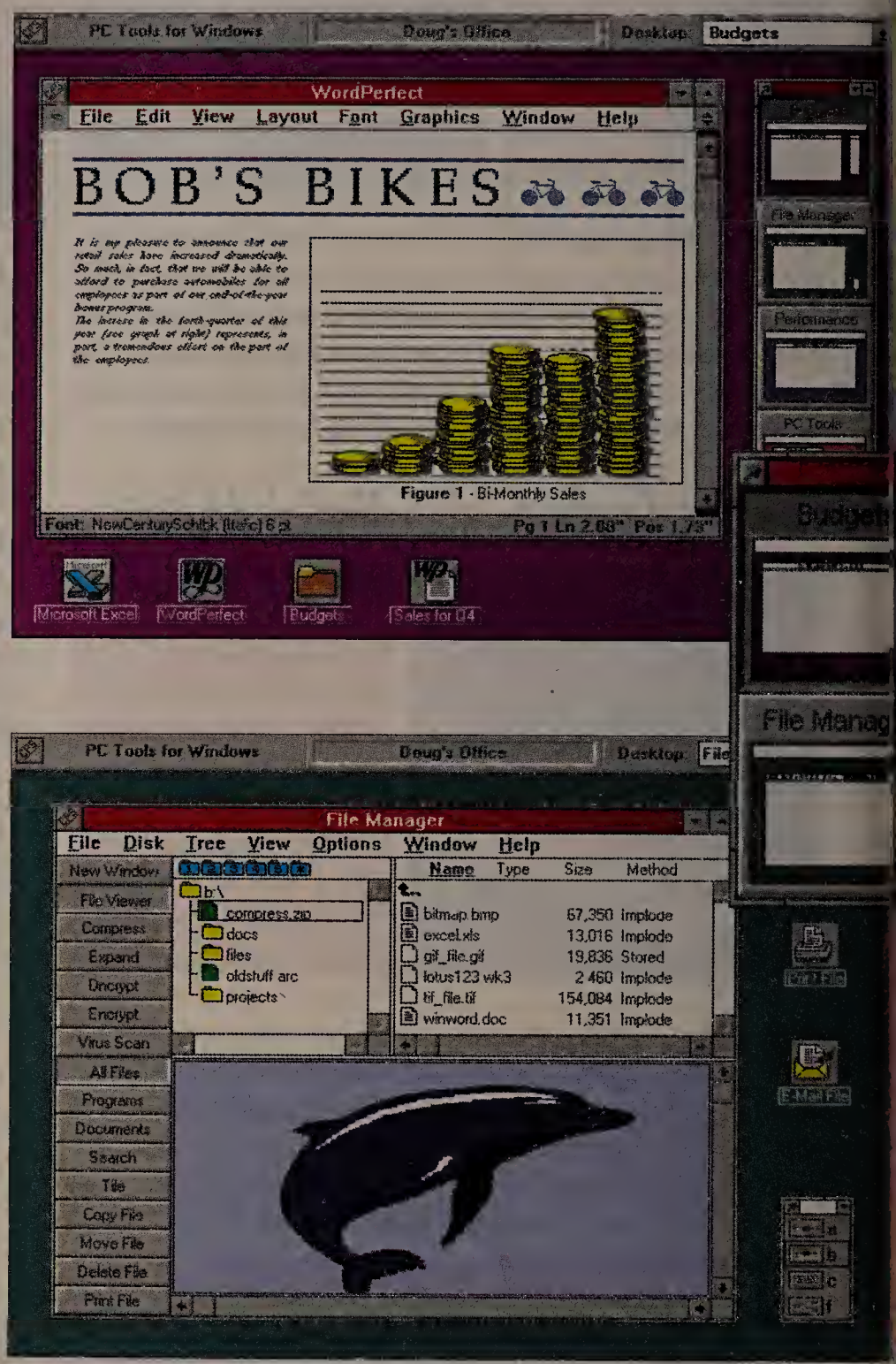

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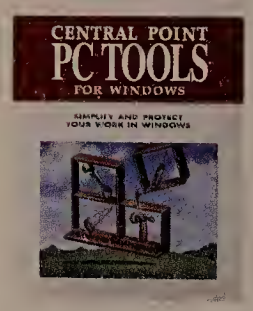

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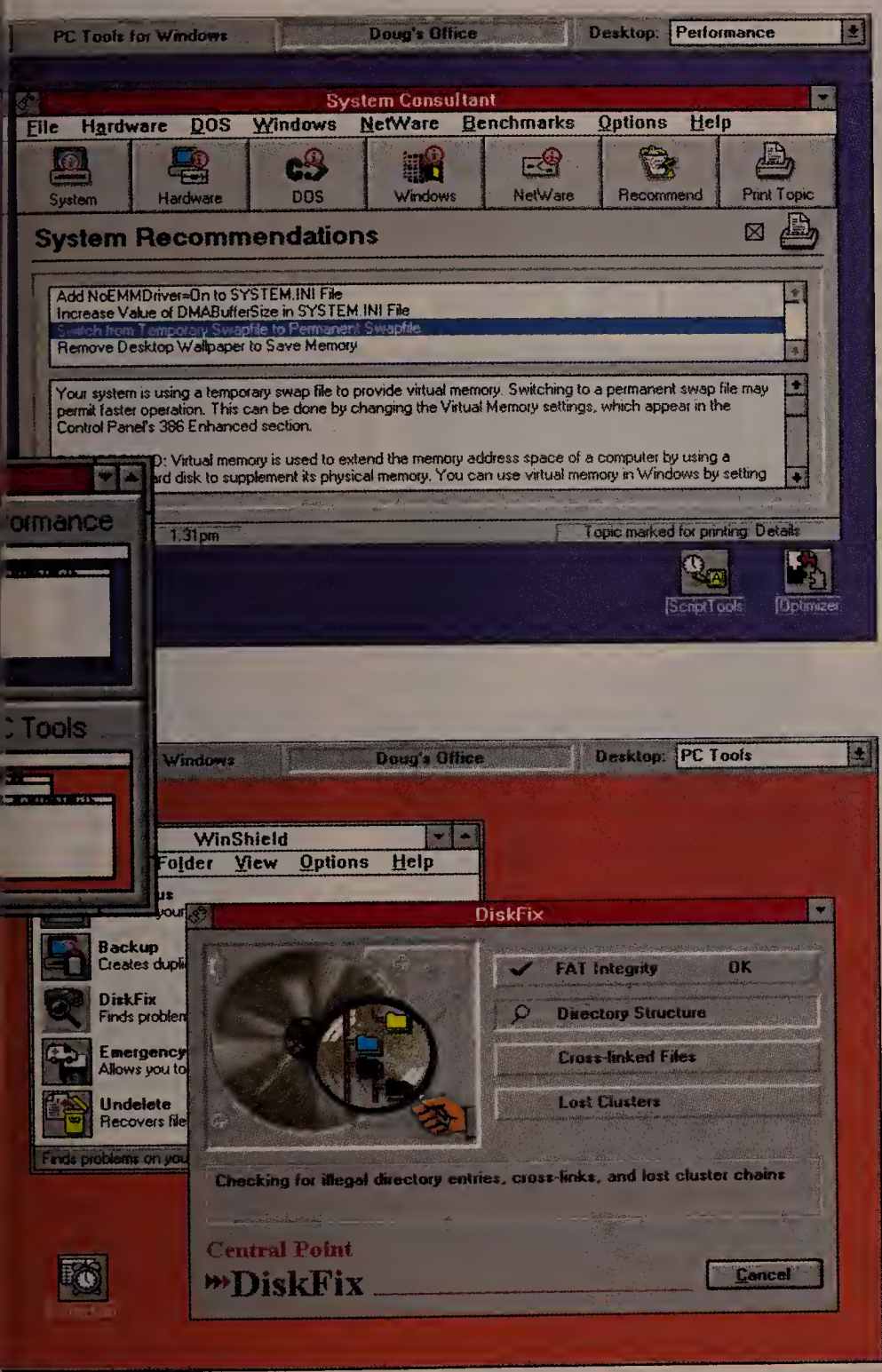

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Compudyne Slimline 386SL/25

VITAL STATISTICS

Direct price: $2227
Processor: Intel 386SL-25
PROS: Fast, excellent battery life, support and keyboard
CONS: 6MB RAM limit, price over $2000
Contact: Compudyne, 800/932-2667, 214/702-5600
Reader service no. 676

Compudyne provided two notebooks for this review, and both earned our Best Buy award. This Intel 386SL-based system is virtually identical to its AMD 386SXL-based sibling; the SL, however, earned a higher rating with its better performance and battery life. It was the fourth fastest notebook overall, nipping in right behind the quick Compaq Contura. But at $2227 with an 80MB hard disk installed, it's the second most expensive system here.

Battery life is great at about 4¾ hours. If you want to swap in a fresh power pack, however, you'll have to shut the unit down first. Portability is average at 7 pounds, 14 ounces.

When it comes to expandability, the Slimline 386SL/25 gets mixed reviews: A 6MB RAM ceiling is none too generous, but if you want your notebook to do double duty on your desktop, Compudyne does offer a docking station that will accept from one to seven standard 8/16-bit peripherals and up to five internal drives.

Compudyne's support policies are pretty good: a two-day turnaround policy and 13 hours of daily toll-free technical support. Since Compudyne is the CompUSA house brand, you have the unusual advantage of being able to take your notebook to any of the company's superstores for service.

Terrific performance, a powerful array of features, and long battery life add up to a solid Best Buy for the Compudyne Slimline 386SL/25, a top-notch traveling companion if we ever met one.

Compudyne Slimline 386SXL/25

VITAL STATISTICS

Direct price: $2027
Processor: AMD 386SXL-25
PROS: Very good battery life, excellent support
CONS: 6MB RAM limit, price slightly over $2000
Contact: Compudyne, 800/932-2667, 214/702-5600
Reader service no. 677

As we mentioned in the review of the Slimline 386SL/25, this Best Buy notebook is a close match to its stablemate. They share the same case, screen, service and support, and many features. But the differences are important. For one thing, at $2027, this notebook costs $200 less. It is also considerably slower, with performance squarely in the middle range, although it runs close to the head of its AMD 386SXL class.

Battery life is good at almost 4¼ hours, though the Slimline 386SL/25 holds a half-hour edge. Like the other Compudyne, this notebook includes an 80MB hard drive, but you can get a larger 120MB optional drive for either.

The two Compudynes have identical keyboards, with a positive, clicky action. And we liked the Compudyne's trackball best of all the built-in units. It's convenient for left- and right-handed users.

The distinction between these two Compudyne Best Buys is clear. If top performance is essential, and you don't mind paying $200 more to get it, the Slimline 386SL/25 is the machine for you. But the more economical Slimline 386SXL/25 is still a solid deal.

CompuTrend Premio SL Notebook

VITAL STATISTICS

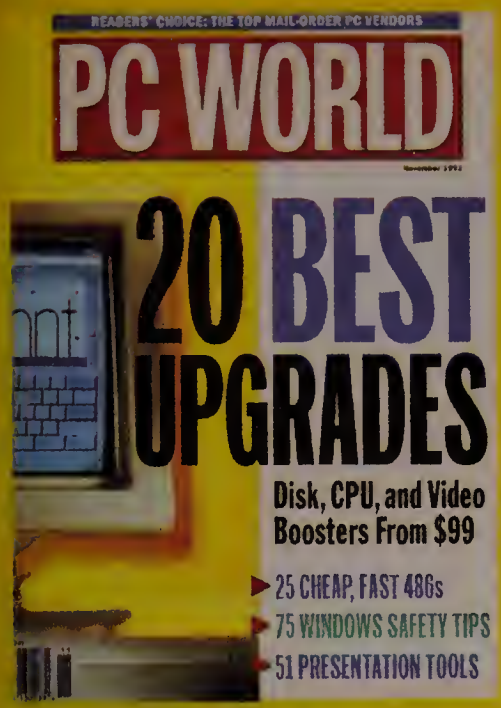
Direct price: $1775
Processor: Intel 386SL-25
PROS: Excellent service and support, very light
CONS: Short 2-hour battery life, awkward built-in trackball
Contact: CompuTrend Systems, 800/677-6477, 818/333-5121
Reader service no. 678

The CompuTrend Premio SL Notebook is the same basic notebook as the Blackship and Chaplet models in this review. As with the other Chaplets, you get a 25-MHz Intel 386SL processor and an 80MB hard disk. Each of the other two models wound up with a top five rating for price, but CompuTrend tacked on more than $100, which caused the company's $1775 Premio Notebook to miss top price ranking. CompuTrend achieved a top-five service ranking, with some of the fastest query response times, accurate advice, and two-day turnaround for repairs. On the downside, however, there's no weekend support, and you have to pay $80 for a year of on-site service.

Performance is not a strong point, as the 16K external memory cache keeps the Chaplet models from matching the performance of most other 25-MHz 386SL contenders, each of whieh has a 64K cache. Battery life was the worst of any system in our roundup at under two hours—although only slightly shorter than that of the Chaplet NBC 386SL-25 and the Blackship BLK 386SL/25 NB.

The biggest attraction for all the Chaplet notebooks is the svelte exterior and light 6-pound, 10-ounce weight. The clicky keyboard with only the <F11> and <F12> keys emulated will attract many, and road warriors will appreciate the internal fax-modem. But don't forget that the built-in trackball, with its poorly placed control buttons, is less than optimum.

Service and support stood out with CompuTrend, although this vendor's price was noticeably higher than the Chaplet's or the Blackship's. As we suggested earlier, if you're hunting for a bargain, you can save cash, wind up with a 120MB hard disk, and get an extra hour of battery life with the Arche NP-201 instead.



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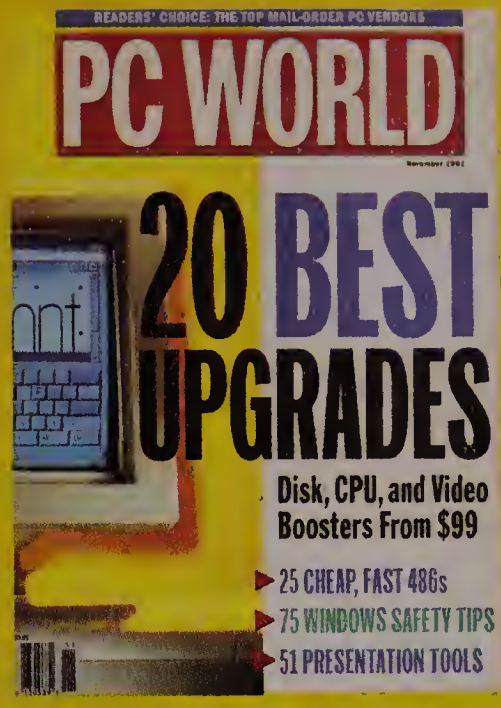

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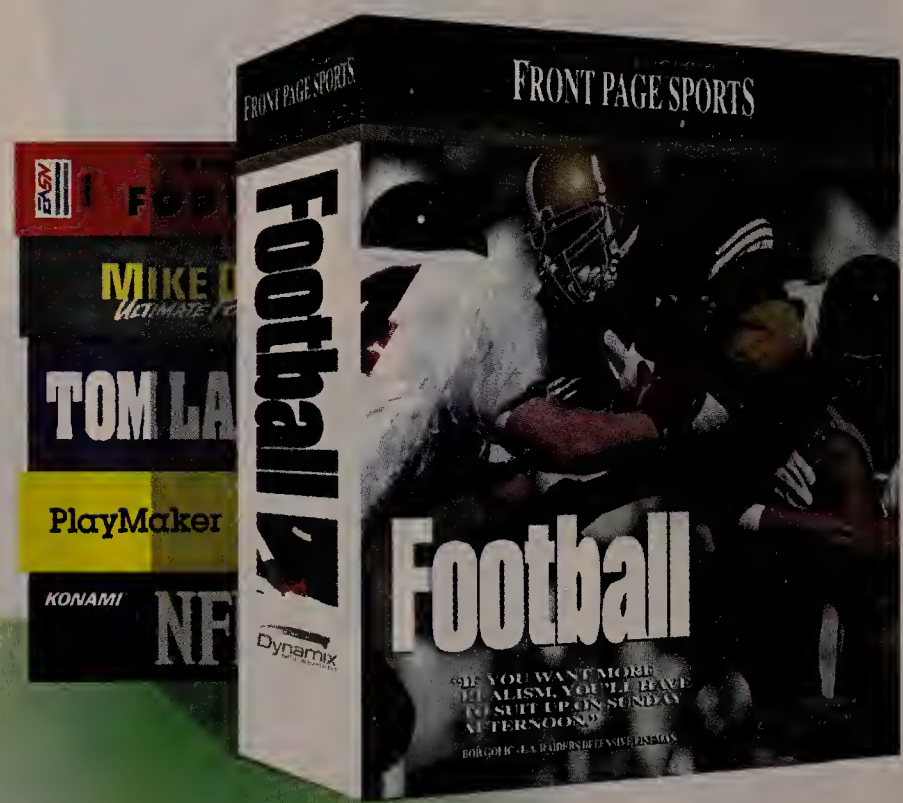

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Cube 325NTX Model 80

VITAL STATISTICS

Direct price: $1995
Processor: AMD 386SXL-25
PROS: No emulated keys, nickel metal-hydride batteries
CONS: Two-handed trackball, mediocre battery life
Contact: Cube Computer, 800/522-2823, 914/592-8282
Reader service no. 679

A lot of thought went into the design of the Cube 325NTX Model 80. The keyboard has large keys, with none of the page or function keys emulated. This was the only system that came with nickel metal–hydride batteries, giving it very quick recharge times. Battery life was mediocre, however, topping out at a mere 2½ hours.

The 325NTX Model 80 has an 80MB hard disk; a 120MB drive is optional, and Cube gives you 16MB of RAM capacity—tops in this review. Further, this notebook is easy on your shoulder, weighing a mere 6 pounds, 10 ounces. The bad news is that the Cube is one of the slowest notebooks here, tying for second slowest on overall performance. It came in dead last on our *Paradox* test.

The Cube mouseball *requires* two hands: While your right hand controls the ball, your left must click the two mouse keys on the other side of the keyboard.

Screen quality and size were consistent among these notebooks, but the Cube display stood out as one of the best, with crisp, clear images. What's more, Cube's service and support policies are very good. Although there's no on-site service, Cube will pay Federal Express to pick up your notebook, and promise to repair and return it in 24 hours. You get toll-free technical support even on weekends.

What's right with this notebook is really right, and the easy portability and fine display provide plenty of allure. If speed and battery life are at the top of your list, however, more than half the notebooks in this review have more to offer.

Darius Professional Plus

VITAL STATISTICS

Direct price: $1699
Processor: AMD 386SXL-25
PROS: Excellent price
CONS: Slowest overall performance, keyboard poorly laid out
Contact: Darius Technology, 800/873-8288, 206/483-8889
Reader service no. 680

Bargain hunters will flip over the Darius Professional Plus' $1699 price. But when they get their hands on the keyboard, they may stumble on its poor layout. The biggest problem is the awkward stretch to hit <Enter>, which causes errors.

High on the list of detractions is this AMD 386SXL system's poor performance. It tests slowest overall and last on all the individual benchmarks except for *Paradox*, where it was second to last.

The Darius's 60MB hard disk is the minimum configuration; you can also buy it with a 120MB drive. Other expandability options: You can plug in a modular 16-bit ethernet adapter, SCSI adapter, fax-modem, or second serial port to either of the two battery slots. In our tests, we found that the Darius lived up to its 3-hour battery life billing, and you can double that if you use both battery slots.

Service and support are sound. You get toll-free technical support (weekdays only). The vendor promises to turn your system around within two days. Darius deserves credit for a fine price and a versatile design. Unfortunately, its slow performance and bad keyboard design put it close to the bottom in overall value.

Dell Dimension NL25

VITAL STATISTICS

Direct price: $1848
Processor: Intel 386SL-25
PROS: Terrific battery life, great keyboard and screen
CONS: Slightly stiff screen adjusters
Contact: Dell Computer, 800/289-3355, 512/338-4400
Reader service no. 681

This same notebook won a Best Buy last September—when it cost a cool $900 more. With the help of its crowd-pleasing $1848 price, it rates another Best Buy here.

The NL25 missed the top five in performance by the barest of margins, placing close to the upper third on every benchmark except BAPCo and best on the disk-intensive *Paradox* test. And you don't have to trade off fuel economy for the extra horsepower: The Dell's long 5½-hour battery life is second only to the ZDS 625nl Model 85. When your battery runs low, you can put your notebook on standby and slide in a fresh battery without needing to power down.

Dell didn't spare any of the other amenities, either. In our opinion, its keyboard layout is best of all the notebooks in the review. It has large, well-placed keys, no emulated page or function keys, and a fairly silent, cushioned action. Dell provides a standard mouse, which is super on a desktop albeit difficult to use on the train.

Dell's built-in screen, with its clear, crisp graphics and text, stood out in a crowd where good displays were the rule. The fine display quality made the screen seem even larger than it actually was. Solid service and support includes a year of on-site replacement of your notebook for $99 and 18 hours daily of toll-free support.

What did we find to criticize on this notebook? Well, the closed-case alarm sounds loudly even when the Dell Dimension NL25 is plugged in, the screen adjusters were a little stiff and hard to move, and the largest current alternative to the 60MB hard disk is only 80MB. But those are quibbles—if you want a quick, inexpensive notebook that can travel coast-to-coast on a single battery, the Dell is your clear Best Buy.

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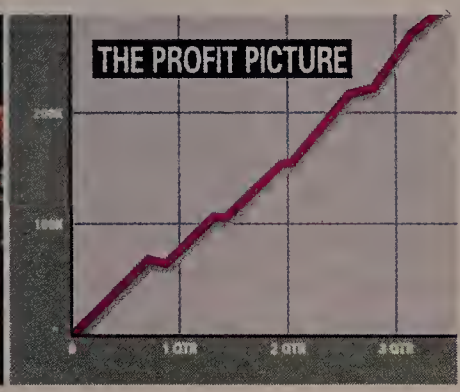

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Micro Express NP925

VITAL STATISTICS

Direct price: $2000
Processor: AMD 386SXL-25
PROS: Excellent battery life, service, support, and keyboard
CONS: Largest footprint in review
Contact: Micro Express, 800/989-9900, 714/852-1400
Reader service no. 682

If you're happiest working with a desktop PC, you'll love the Micro Express NP925. This handsome black notebook gives the impression of being bigger than it is, putting the desktop user at ease with a spacious keyboard layout. In exchange for the fine keyboard, you do give up some portability. The NP925 has the largest footprint in our review and weighs 8 pounds, 12 ounces.

But Micro Express didn't ignore travelers. The battery life is exemplary, providing over 5 hours of computing with the dual battery pack installed. Service is good enough to place second out of 18 vendors in this review. You get a 15-month warranty, a two-day turnaround policy, and a notebook user's dream: 24-hour, 365-day-a-year, toll-free technical support. When we called, we got outstanding responsiveness and accurate advice.

Performance, as with the other AMD 386SXL systems, was only middling. But for the $2000 price, you get a big 120MB hard disk and a fax-modem. Expansion options for this PC include a scanner package, ethernet or SCSI adapters, an extra serial port, and a voice-mail package. Just a little more speed would have earned the NP925 a Best Buy in this review. But if your typing suffers when you use a compromise keyboard, the NP925 makes a smart buy.

Swan 386SX/25

VITAL STATISTICS

Direct price: $1707
Processor: AMD 386SXL-25
PROS: Outstanding price, removable hard drive
CONS: Poor battery life, no service turnaround policy
Contact: Swan Technologies, 800/468-9044
Reader service no. 683

Like Compudyne, Swan sent us two notebooks for this review. The 386SX/25's model name implies an Intel processor, but the unit's CPU is actually an AMD 386SXL-25.

This nice-looking charcoal gray unit has a single-handed easy-open design; you simply pull up on the front tab, and the case pops open. The Swan's keyboard is intelligently laid out and has the full travel action of a desktop keyboard.

Service and support is a strong point of all the Swan desktop computers, although the notebook units are backed with just a one-year warranty and no on-site service. In addition, the company has no stated repair-turnaround policy. Fortunately, the toll-free technical support was good.

This notebook comes standard with a 60MB hard disk, but you have the option of buying it with a 120MB drive. Don't expect top performance from this machine—it ties the Cube 325NTX Model 80 for second to last overall. The bargain-hunter's price makes it attractive, but when you look at the anemic performance, you'll be much more drawn to its 486SLC stablemate.

PC WORLD TEST CENTER REPORT

ZDS: Six Hours, Still Going

***Best Buy**

Time in minutes.

Methodology
We drained the notebooks' batteries and then fully charged them. We set the power-saving options on each notebook, where possible, to best fit this profile: doze mode timeout, 1 minute; sleep mode timeout, 3 minutes; LCD timeout, 1 minute; CPU timeout, 1 minute; modem and serial ports disabled; low battery alarm enabled. Ten office workers with varying skills typed documents for regular intervals in *Word for Windows*, saving files periodically. We kept the notebooks rotating among our pool to drain the batteries evenly. We repeated the tests twice for accuracy and report the times elapsed between turning the notebooks on and when they shut themselves off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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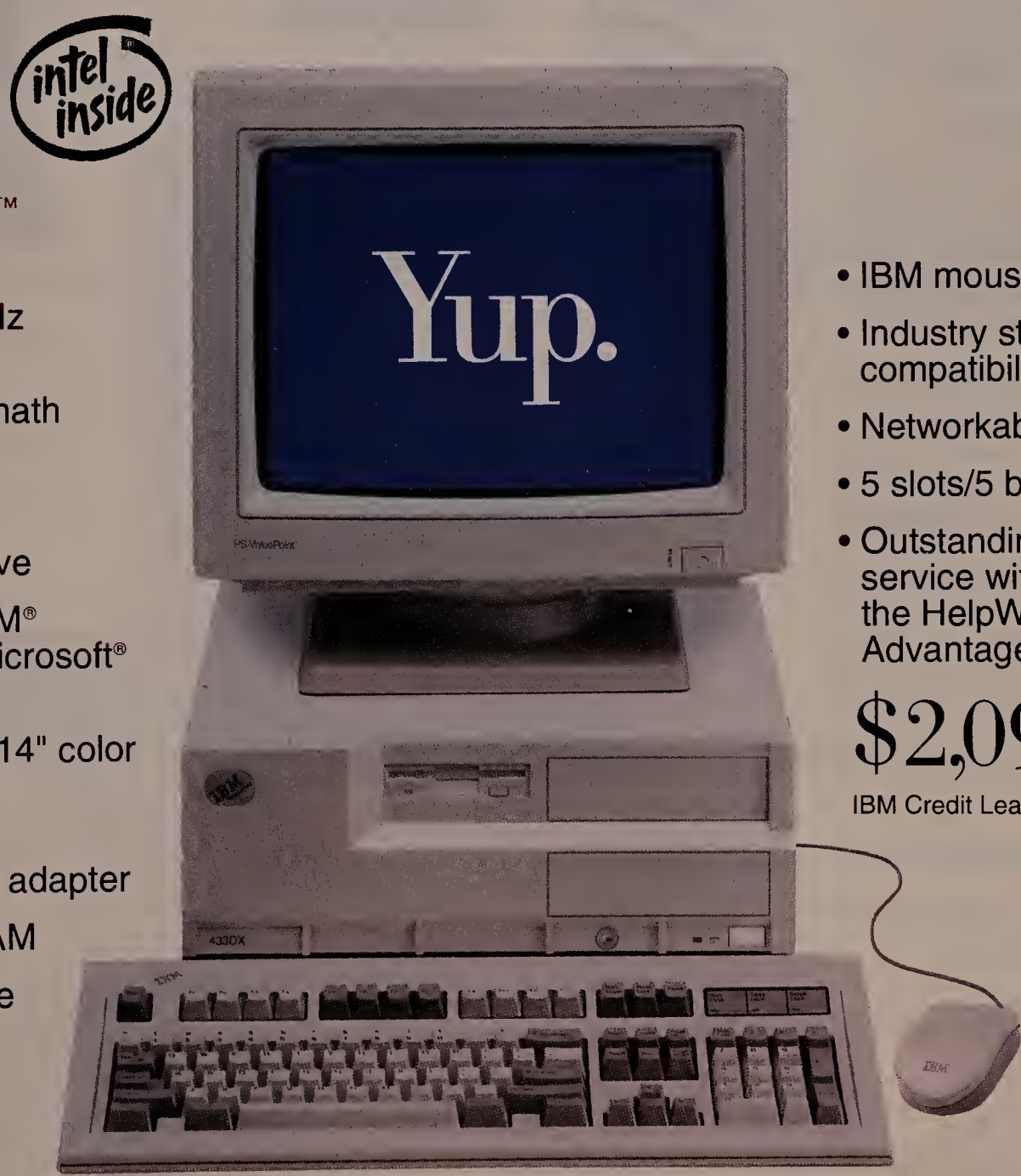

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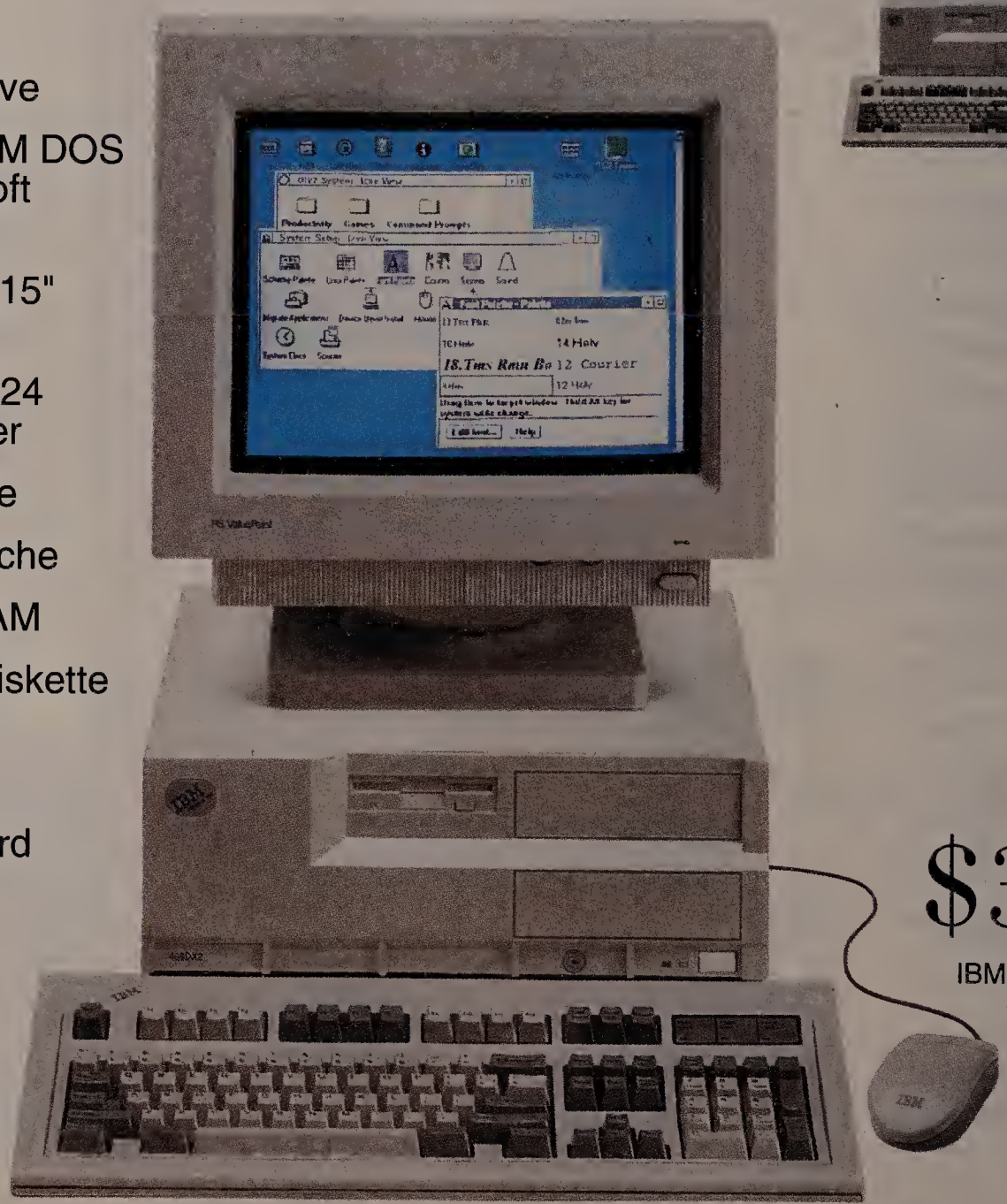

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†ThinkPad 300 and 700C systems and options are manufactured in Japan. PS/ValuePoint 6312, 6314, and 6319 Color Displays are manufactured in Korea. PowerGraph X-24 graphics adapter is manufactured in Mexico.
††PRODIGY will not run without a modem. A modem is not included with the ThinkPad 700C. A customer who acquires a ThinkPad 700C and a modem which operates at a speed below 9600bps may contact PRODIGY to obtain a One-Month Free Trial Membership.
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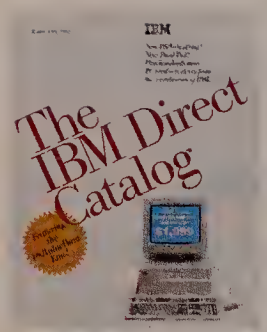

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Port Replicator	$120
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DOS 5.0 Stacker V2.0 and 386MAX 6.0	$135**
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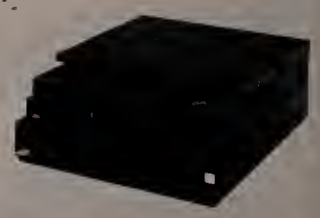
IBM 6314 Color Display†	$530
IBM 6319 Color Display	$660



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Aspen, Compaq, and Swan: Power on the Go

	Freelance for Windows 1.0	Word for Windows 2.0	Excel 4.0	Paradox 3.5 in DOS window	BAPCo SYSmark92
Aspen Aquiline Personal 486 (Cx486SLC-25)	435	408	403	475	46
Swan 486/SLC-25 (Cx486SLC)	433	418	412	512	46
Compaq Contura 3/25 Model 84/w+* (Intel 386SL-25)	488	434	425	484	44
Compudyne Slimline 386SL/25* (Intel 386SL-25)	457	444	417	528	41
BCC SL325 (Intel 386SL-25)	455	429	397	530	39
Dell Dimension NL25* (Intel 386SL-25)	506	480	441	471	40
AcerAnyWare V386SL* (Intel 386SL-25)	484	474	448	537	40
Chaplet NBC 386SL-25 (Intel 386SL-25)	529	489	482	567	40
Blackship BLK 386SL/25 NB (Intel 386SL-25)	531	497	491	584	41
CompuTrend Premio SL Notebook (Intel 386SL-25)	518	497	495	564	40
Toshiba Satellite T1850 (Intel 386SX-25)	515	491	470	592	37
CAF AquaLite-II (AMD 386SXL-25)	533	525	495	612	39
Compudyne Slimline 386SXL/25* (AMD 386SXL-25)	511	499	378	592	36
ZDS 625nl Model 85 (Intel 386SL-25)	581	543	523	556	37
Arche NP-201 (AMD 386SXL-25)	507	516	456	547	34
Micro Express NP925 (AMD386SXL-25)	594	564	516	564	37
Austin 386/SXL-25 (AMD 386SXL-25)	571	549	482	580	36
Cube 325NTX Model 80 (AMD 386SXL-25)	586	573	525	669	36
Swan 386SX/25 (AMD 386SXL-25)	603	591	542	602	36
Darius Professional Plus (AMD 386SXL-25)	639	608	567	644	33

*Best Buy

The systems in this review are arranged in order of overall speed, with the fastest at the top and the slowest at the bottom.

All the test results are in seconds except for the BAPCo test results, which are given in number of scripts executed per hour.

Methodology
All systems tested were configured with 4MB of RAM (with the exception of the two Compudyne notebooks, which we received with 6MB of RAM installed) and DOS 5.0. If we had to install *Windows* ourselves, we performed the program's default installation. We configured *Windows* on every one of the systems with a Hewlett-Packard LaserJet III as the default printer, disabled the Print Manager, and attached a null printer to LPT1. Using the vendor-supplied video drivers, when provided, we set the resolution to 640 by 480 pixels in 16 colors. Finally, we loaded the test applications, test files, the scripts necessary to automate testing, and *Microsoft Test* (automation software).

Freelance for Windows 1.0
We start by loading a single-page starter file (built from a standard template included with the *Freelance* program) containing a U.S. map with each state as a separate object. Then we enter preformatted text on the page in preset headings, add a second page, and enter text as bulleted items. We add three more pages—each containing a single 3-D bar chart—and import data from a WK1 file. Next we add a sixth page containing four 3-D pie charts and preview a slide show using a vertical-louver fade effect between each slide. We apply various views to the presentation and then preview the slide show four more times, applying a completely different fade effect between slides with each preview. Finally, we save the presentation to disk to complete the test.

Word for Windows 2.0
We spell-check and scroll through a 27-page document; create, format, print, and save a single-page business letter; and open another document, add a single paragraph, then preview and print it out.

Excel 4.0
We perform several data extracts; build and format an extensive financial statement from scratch and print it; then open a mortgage analysis, and scroll, move blocks, change the interest rate, print-preview the statement, and finally save the file.

Paradox 3.5 in DOS window
Running the program in a DOS window, we perform an extensive variety of data entry, record searching, and updating tasks. Then we generate reports against a simple customer list to simulate a typical activity generated in the use of a business database application.

BAPCo SYSmark92
We run a scripting program that automates all the applications run in the test from start to finish. It loads common database, desktop publishing, presentation graphics, software development, spreadsheet, and word processing applications and executes a variety of typical tasks with each. The following software packages are used in this test: *Aldus PageMaker 4.0, dBASE IV 1.1, Harvard Graphics 3.0, 1-2-3 3.1, Microsoft C 6.0, Microsoft Excel 3.0, Microsoft Word for Windows 2.0, Paradox 3.5, Quattro Pro 3.0,* and *WordPerfect 5.1.*

All the data based on tests designed and conducted by the PC World Test Center with the exception of BAPCo SYSmark92, which is an industry standard test designed by the Business Application Performance Corporation. Testing performed by PC World performance analysts Ulrike Diehlman and Susan Silvius. All rights reserved.

Swan 486/SLC-25

VITAL STATISTICS

Direct price: $1953
Processor: Cyrix 486SLC
PROS: Top-notch performance, removable hard drive
CONS: No service turnaround policy
Contact: Swan Technologies, 800/468-9044, 814/234-2236
Reader service no. 684

Unlike its 25-MHz AMD 386SXL sibling, the Swan 486/SLC-25 is a real scorcher. This 25-MHz Cyrix 486SLC notebook came in second overall, just slightly behind the Aspen Aquiline Personal 486. The system placed first on the *Freelance* test, second on BAPCo SYSmarks and *Word for Windows*, and no lower than fourth on any individual benchmark. And you can get this great performance at a surprisingly reasonable price—just $1953 direct.

Battery life is also good; batteries kept the notebook running for 4¼ hours. What's more, you can install a fresh one with the notebook on standby. Portability is good, too; like its sibling, the Swan 486/SLC-25 weighs just 7 pounds, 10 ounces.

Either of the Swan notebooks lets you run the internal screen at the same time as the external display, but not in SVGA resolution.

Case design, keyboard, mouse, hard disk, and service policies are all identical to the Swan 386SX/25. Although this Cyrix 486SLC-based notebook didn't make it into our top echelon, its outstanding performance, and under-$2000 price make it hard to resist.

Toshiba Satellite T1850

VITAL STATISTICS

Street price: $1999
Processor: Intel 386SX-25
PROS: Very good battery life
CONS: Biggest, heaviest notebook in review
Contact: Toshiba America, 800/334-3445, 714/583-3000
Reader service no. 685

The Toshiba Satellite T1850 is the only notebook using an Intel 386SX-25 in this review. The system's performance was mid-pack, comparable to that of the AMD 386SXLs. You can probably chalk this up to the lack of an external memory cache. Battery life, however, was a solid 4 hours.

At $1999, it's a moderately priced machine and comes with an 80MB hard drive. RAM is expandable all the way to 12MB. Toshiba service and support policies are excellent. Furthermore, you can get service for your notebook from any authorized Toshiba dealer.

FEATURES COMPARISON

Affordable Notebooks: Shaping Up to Take Care of Business

	BEST BUY AcerAnyWare V386SL	Arche NP-201	Aspen Aquiline Personal 486	Austin 386/SXL-25	BCC SL325	Blackship BLK 386SL/25 NB	CAF AquaLite-II	Chaplet NBC 386SL-25
Standard features								
Direct/street price 12/92[1]	$2073	$1507	$2270	$1990	$1895	$1649	$1638	$1634
List price 12/92[1]	$2298	$2153	$2270	$1990	none[3]	$1649	$1930	$1969
Processor	i386SL-25	AMD 386SXL-25	Cx486SLC-25	AMD 386SXL-25	i386SL-25	i386SL-25	AMD 386SXL-25	i386SL-25
External memory cache (K)	64	0	0	0	64	16	0	16
Installed/maximum RAM (MB)	4/12	4/8	4/12	4/8	4/8	4/8	4/8	4/8
Installed hard disk/largest hard disk option (MB)	120/120	120/120	120/120	60/120	80/120	80/120	80/120	80/80
Portability								
Traveling weight (pounds:ounces)	7:12	8:0	8:10	7:12	8:2	6:10	7:4	6:10
Dimensions (inches)[5]	11.4 x 8.5 x 1.9	11 x 8.4 x 1.8	11.5 x 8.8 x 2.3	11 x 8.5 x 1.9	11 x 8.5 x 2.3	11.3 x 8.5 x 1.5	11 x 1.6 x 8.7	11.3 x 8.5 x 1.5
Volume (cubic inches)	182.2	166.3	226.4	177.7	187	144.1	149.8	144.1
Power management								
Battery life (hours:minutes)	3:39	3:03	2:52	3:57	3:56	2:09	3:16	2:17

[1] Except where noted, standard system configuration includes 4MB RAM, a 1.44MB internal floppy drive, 2400-bps internal modem, mouse or trackball, Windows, and DOS. If vendor doesn't offer an option, we add on a fair estimated market value.

[2] Vendor provided street price.

Toshiba's screen seemed particularly nice, and the company throws in *Ultrafont* software to help improve screen readability. Additional options include an external battery charger, car adapter, and internal proprietary fax-modem. Traveling weight is a hefty 8 pounds, 14 ounces, which gives it the dubious distinction of being the heavyweight of this review.

What blemishes the Toshiba's picture? Its heft, mainly. The company has earned a devoted notebook clientele, and if you don't mind the weight, this system is well worth considering.

ZDS 625nl Model 85

VITAL STATISTICS

Street price: $1858
PROS: Six-hour battery life, excellent keyboard, enhanced parallel port
CONS: Slow Excel performance
Contact: Zenith Data Systems, 800/227-3360, 708/808-5000
Reader service no. 686

The ZDS 625nl Model 85 brought us the closest we have ever come to getting a full day's work done on a single battery. This smooth, white Intel 386SL-25 notebook managed to run for an amazing 6 hours off a single power pack. That's almost half an hour more than the next best system, the Best Buy Dell Dimension NL25, and over 2 hours more than the average in this review. These phenomenal results show that ZDS's arduous work on extending battery life has really paid off. Even the internal modem ZDS supplies is "rest-aware," meaning it goes to sleep when not needed. And when your battery pack runs out of juice, you can swap in a fresh one without switching off the system.

At $1858, the 625nl Model 85 is priced right, too. Performance, however, was mediocre, even with a 64K external memory cache—particularly on the *Excel* test. This was the slowest 386SL-based notebook we tested, falling far behind the Compaq Contura Model 3/25 84/w+ and even further behind the parade-leading Cyrix 486SLC notebooks. This system is also a bit heavier than most at 8 pounds, six ounces.

The keyboard is really nice with no emulated page or function keys, full travel, and a good feel. And ZDS provides its own standard mouse. The ZDS also features an enhanced parallel port, letting you team it up with some parallel-to-SCSI adapters and get performance comparable to a plug-in card. That's great news if you want to add an external CD ROM for multimedia. More and more, notebook vendors are including these enhanced ports, so if you think you'll need one, check before you buy.

Although this notebook doesn't break into the ranks of the Best Buys, it's still a very good value. If long battery life is a must, the ZDS 625nl Model 85 really delivers. The system's 6 hours of battery life sets a standard for other notebook vendors to live up to and shows us that it shouldn't be too long until we can get a full 8-hour day's worth of work out of one of these notebooks.

	T BUY Compaq Contura 3/25 Model 84/w+	BEST BUY Compudyne Slimline 386SL/25	BEST BUY Compudyne Slimline 386SXL/25	CompuTrend Premio SL Notebook	Cube 325NTX Model 80	Darius Professional Plus	BEST BUY Dell Dimension NL25	Micro Express NP925	Swan 386SX/25	Swan 486/SLC-25	Toshiba Satellite T1850	ZDS 625nl Model 85
	$2170	$2227	$2027	$1775[2]	$1995	$1699[2]	$1848	$2000	$1703	$1953	$1999[2]	$1858
	none[3]	$2227	$2027	none[3]	$1995	none[3]	$1848	$2000	$1703	$1953	none[3]	none[3]
	i386SL-25	i386SL-25	AMD 386SXL-25	i386SL-25	AMD 386SXL-25	AMD 386SXL-25	i386SL-25	AMD 386SXL-25	AMD 386SXL-25	Cx486SLC	i386SX-25	i386SL-25
	64	64	0	16	0	0	64	0	0	0	0	64
	4/12	6/6	6/6	4/8	4/16	4/8	4/8	4/8	4/8	4/8	4/12	4/8
	80/120	80/120	80/120	80/120	80/120	60/120	60/80	120/120	60/120	60/120	80/120	80/120
	7:14	7:14	7:14	6:10	6:10	8:8[4]	8:6	8:12	7:10	7:10	8:14	8:6
	8.9 x 11.7 x 1.9	11 x 8.7 x 1.6	11 x 8.7 x 1.6	11.3 x 8.5 x 1.5	11 x 8.5 x 2.0	11.8 x 8.5 x 1.8	11 x 8.3 x 1.8	12.2 x 9.5 x 1.7	11 x 8.5 x 1.8	11 x 8.5 x 1.8	11.8 x 8.3 x 2.3	11 x 8.5 x 2
	197.9	153.1	153.1	144.1	187	180.5	163.3	197	168.3	168.3	218.1	187
	4:04	4:42	4:10	1:58	2:30	3:06	5:38	5:04	2:17	4:14	4:04	6:03

[3] Company doesn't publish list prices. [4] Without modem. [5] Width by depth by height.

Table continues on following pages

FEATURES COMPARISON

Affordable Notebooks *continued*

● Yes
○ No
n/a = not available

	BEST BUY AcerAnyWare V386SL	Arche NP-201	Aspen Aquiline Personal 486	Austin 386/SXL-25	BCC SL325	Blackship BLK 386SL/25 NB	CAF AquaLite-II	Chaplet NBC 386SL-25
Power management (continued)								
Charge indicator shows full charge	●	○	○	●	●	●	●	●
Supports Intel/MS Advanced Power Mgmt. (APM)	●	○	○	○	●	●	○	●
Suspend button	●	●	●	●	○	●	●	●
Timed suspend	●	●	●	●	●	●	●	●
Change battery with suspend on	●	○	●	●	○	○	●	○
Set timeouts for HDD	●	●	●	●	●	●	●	●
Set timeouts for display	●	●	●	●	●	●	●	○
Set timeouts for ports	●	○	○	○	●	○	○	○
Set timeouts for modem	●	○	○	○	●	○	○	○
Turns on or resumes on modem ring	●	○	○	○	●	●	●	●
Expandability								
Keyboard port	●[9]	●	●	●	●[9]	●	●	●
Mouse port	●[9]	●	○	○	●[9]	○	●	○
SCSI port	○	○	○[11]	○	○	○	○	○
Internal modem available	●[12]	●[13]	●[13]	●[13]	●[13]	●[13]	●[13]	●[13]
Docking station available	●	○	●	○	○	○	○	○
PCMCIA slot	●	○	○	○	○	○	○	○
Display								
Screen (square inches)	43.8	43.8	44.6	43.8	44.6	44.6	44.6	44.6
Screen (diagonal)	9.5	9.5	9.8	9.5	9.8	9.5	9.8	9.8
SVGA output	●	●	●	○	○	○	●	○
Simultaneous LCD and CRT	●	●	●	○	○	○	●	○
Keyboard								
Cursor keys in standard T	●	●	●	●	●	●	●	●
Dedicated page control keys	●	●	○	○	○	●	●	●
All 12 function keys dedicated	○	●	●	○	●	○	○	○
Standard <Alt> <Ctrl> layout	●	○	○	○	●	●	●	●
Built-in trackball	○[14]	○	●[15]	●	○	●	○	●
Service and support								
Warranty (months)	12	12	12	12	12	12	12	12
On-site service price for first year	none	none	none	none	none	none	none	none
Turnaround policy (days)	1	4	1	2	3	2	3	3
Free unlimited support	●	●	●	●	●	●	●	●
Toll-free central support	●	○[17]	●	●	●	●	○[17]	○[17]
Daily support (hours)	12	9	8	24	10	9	9	9
Weekend support	●[18]	○	●[18]	●	○	○	○	○
BBS	●	○	●	●	●	●	○	○
Fax	●	●	●	●	●	●	●	●
Dedicated support staff required	○	○	●	●	○	n/a	●	○
Support staff training required	n/a	n/a	●	●	n/a	n/a	●	n/a
Dedicated support line for dealers	●	○	●	●	●	n/a	●	○
Inventory and parts requirement	○	○	●	○	○	n/a	○	○
Service available from any authorized dealer	○	○	n/a	n/a	○	n/a	●	○

[6] Resume on bootup optional. [7] With optional battery installed. [8] Serial only. [9] One dual-function port for keyboard and mouse. [10] Combined keyboard and mouse port. Mouse adapter required.

	ST BUY Compaq Contura 3/25 Model 84/w*	BEST BUY Compudyne Slimline 386SL/25	BEST BUY Compudyne Slimline 386SXL/25	CompuTrend Premio SL Notebook	Cube 325NTX Model 80	Darius Professional Plus	BEST BUY Dell Dimension NL25	Micro Express NP925	Swan 386SX/25	Swan 486/SLC-25	Toshiba Satellite T1850	ZDS 625nl Model 85
	○	●	●	○	○	○	●	○	●	●	●	●
	○	●	○	●	○	●	●	○	○	●	●	○
	●	●	●	●	●	●	●	○	●	●	○	●
	●	●	●	●	●	●	●	●	●	●	○[6]	●
	●[7]	○	○	○	○	○	●	○	●	●	●	●
	○	●	●	●	●	●	●	●	●	●	●	●
	○	●	●	○	●	●	●	●	●	●	●	●
	○	●	○	○	○	○	●	○	○	○	○	●[8]
	○	●	○	○	○	○	●	○	○	○	○	●
	○	●	●	●	○	○	●	○	●	●	○	●
	●[9]	●[10]	●[10]	●	●	●	●	●	●[9]	●[9]	●	●[9]
	●[9]	●[10]	●[10]	○	●	○	●	○	●[9]	●[9]	●	●[9]
	○	○	○	○	○	○[11]	○	○[11]	○	○	○	○
	●[13]	○	○	●[13]	●[13]	●	○	●[13]	●	●	●	●
	○	●	●	○	○	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○	○	○	○	○
	43.8	43.8	43.8	44.6	44.6	43.8	44.6	44.6	43.8	43.8	43.8	43.8
	9.5	9.5	9.5	9.8	9.8	9.5	9.8	9.8	9.5	9.5	9.5	9.5
	○	●	●	○	●	○	●	●	○	○	○	○
	○	●	●	○	○	○	○	○	●	●	○	○
	●	●	●	●	●	●	●	●	●	●	●	●
	○	●	●	●	●	●	●	●	○	○	●	○
	○	○	○	○	●	○	●	○	○	○	●	○
	○	●	●	●	●	○	○	○	●	●	○	○
	○	●	●	●	●	○	○	○	○	○	○	○
	36	12	12	12	12	12	12	15	12	12	12	12
	free	none	none	$80	none	none	$99[16]	none	none	none	free	varies
	2	2	2	2	1	2	3	2	none	none	2	2
	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●
	24	13	13	9	11	9	18	24	12	12	10	15
	●	●[18]	●[18]	○	●	○	●	●	●	●	○	○
	●	●	●	○	●	●	●	○	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	○	●
	○	●	●	○	n/a	○	n/a	n/a	n/a	n/a	○	n/a
	n/a	●	●	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	●	●	●	●	n/a	●	n/a	n/a	n/a	n/a	●	n/a
	○	●	●	○	n/a	○	n/a	n/a	n/a	n/a	○	n/a
	○	●	●	○	n/a	○	n/a	n/a	n/a	n/a	●	○

[11] Optional. [12] PCMCIA modem. [13] Fax-modem. [14] Clip-on mouse. [15] Side mount. [16] On-site system replacement with data recovery if possible. [17] No toll-free number. [18] Saturdays only.

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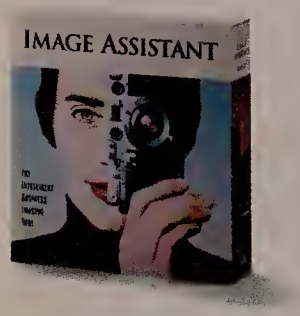

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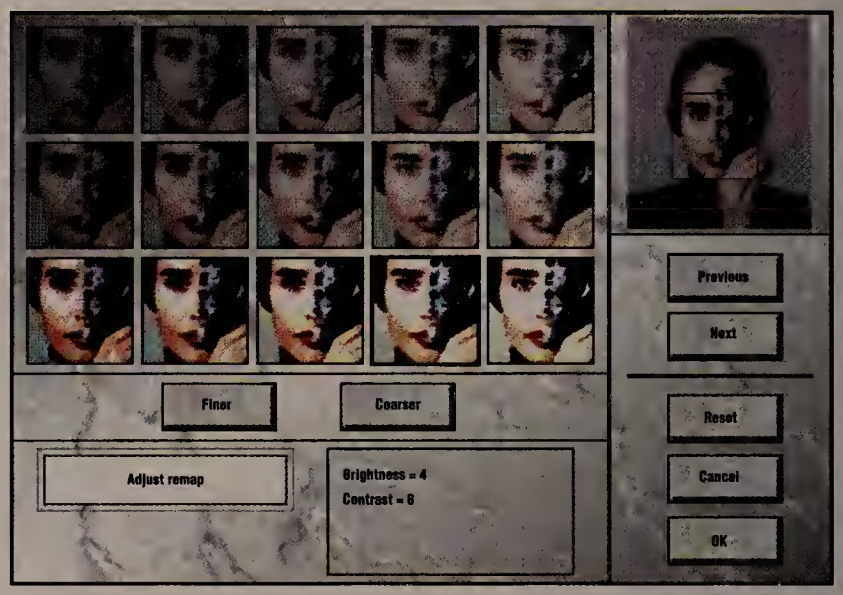

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Circle 17 on reader service card

LOCAL BUS

Local bus systems put peripherals on the same high-speed thruway with CPU and memory. But are the speed benefits really significant? If they are, which standard should you bank on? By Michael Desmond

This year's secret ingredient for high-performance computing is local bus technology. Compared with other hardware advances, such as new CPU architectures or optical storage schemes, this one seems long overdue. And its arrival heralds an important advance in PC architecture.

Over the past few years, PC technology has leapfrogged itself. Rapid advances in processor power have outpaced the decade-old ISA expansion bus, and even enhanced bus standards such as EISA and Micro Channel have fallen behind. The disparity can leave high-powered CPUs spinning their wheels while hard disks, video boards, and other peripherals send and receive data along a slow, narrow path. Local bus systems break this bottleneck by taking peripherals off the expansion bus and connecting them directly to the CPU bus, opening a wider, faster pipeline between the CPU and peripherals. Compared to the ubiquitous ISA bus, with its 16-bit data path and 8-MHz clock speed, local bus systems speed data along 32 bits at speeds as high as 50 MHz. The results are

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The Key to Faster PCs?

throughputs as fast as 130MB per second, more than six times faster than ISA's 20MB-per-second limit.

In *PC World* tests, local bus systems consistently place in the top 10 to 15 percent of systems we review. True, it's not clear that local bus is the key factor in this strong performance, since the cutting-edge peripherals and controllers used in the systems also boost performance. But if you want to be ready for such demanding future applications as full-motion video, high-fidelity sound, or multitasking with the likes of Windows NT, you'll probably need the enhanced speed and capacity that local bus provides.

Which local bus should you choose? Today you have three basic options, all of which put local bus capability on the motherboard alongside traditional ISA, EISA, or Micro Channel slots. A number of manufacturers (including NEC, Dell, and Hewlett-Packard) have developed proprietary local bus systems, most of which integrate local bus video on the motherboard. But two emerging standards—one already manifest in many new machines, one just coming to market—continue the PC tradition of open architecture, offering standardized slots into which you can plug the high-speed local bus peripherals of your choice.

The first standard, known as VESA local bus (VL bus) and developed by the Video Electronics Standards Association, is built into a wide range of systems from firms such as Gateway 2000, Zeos Int'l, and Hyundai Electronics. The second standard, called Peripheral Component Interconnect (PCI), was developed by Intel as a high-end alternative to VL bus and will feature systems from major players such as IBM, Compaq, and NEC.

The real benefits may not show themselves until Windows NT and OS/2 applications begin to take advantage of the environments' multitasking capability.

Both VL and PCI open a fast lane for PC peripherals. So far, however, local bus's biggest payoff has been in high-performance, inexpensive video hardware. Many manufacturers say demanding graphics applications make video the one area where local bus technology really earns its keep, since components such as hard disks and modems are still well served by the standard ISA bus.

NEC was the first major PC manufacturer to incorporate local bus video into a line of systems. (One of NEC's latest entries, the 466, a 486DX2-66 member of its Image line, turned in the fastest scores of any system we've tested.) Late last year, Dell followed suit with a new line of 18 PCs that offer proprietary local bus video integrated into the motherboard at no extra cost. Glenn Henry, senior vice president of The Prod-

Local Bus Adds High-Speed Connection for Peripherals

The throughput of the PC's CPU-memory bus has grown substantially, but the standard expansion bus has not kept pace. Extending the CPU-memory bus with a local bus gives a system a high-speed connection for high-performance peripherals and lets the system retain an ISA, EISA, or MCA bus for less-demanding devices.

Standard ISA architecture

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uct Group at Dell Computer, explains, "We saw no reason to put anything on the local bus except video. Given that we have integrated high-performance video on the local bus, we saw no reason to add the expense of VL expansion slots."

This may be a good strategy for the short term, but proprietary, slotless options have serious limitations. Although manufacturers currently have trouble demonstrating the benefits of putting a hard disk controller on the local bus, future mass storage products may well exploit the increased throughput—and proprietary systems will lack the slot to accommodate them. Moreover, the pace of video technology will likely leave today's local bus video controllers a generation behind within a year; and when the video controller is hardwired to the motherboard, it cannot be replaced.

VL Bus: First Among Standards

The VESA local bus standard was designed as a low-cost, quick-to-market solution. As a result, VL-compliant computers and add-in cards cost little more than their conventional ISA-only counterparts. The standard is attracting plenty of vendors, as board makers from ATI to Western Digital are selling—or will soon introduce—graphics adapters, disk controllers, and LAN cards that comply with it.

But VL's cost-conscious design makes some significant trade-offs. No more than two expansion boards can run on a VL bus; running three peripherals requires that at least one be integrated into the motherboard. And each additional local bus peripheral degrades performance.

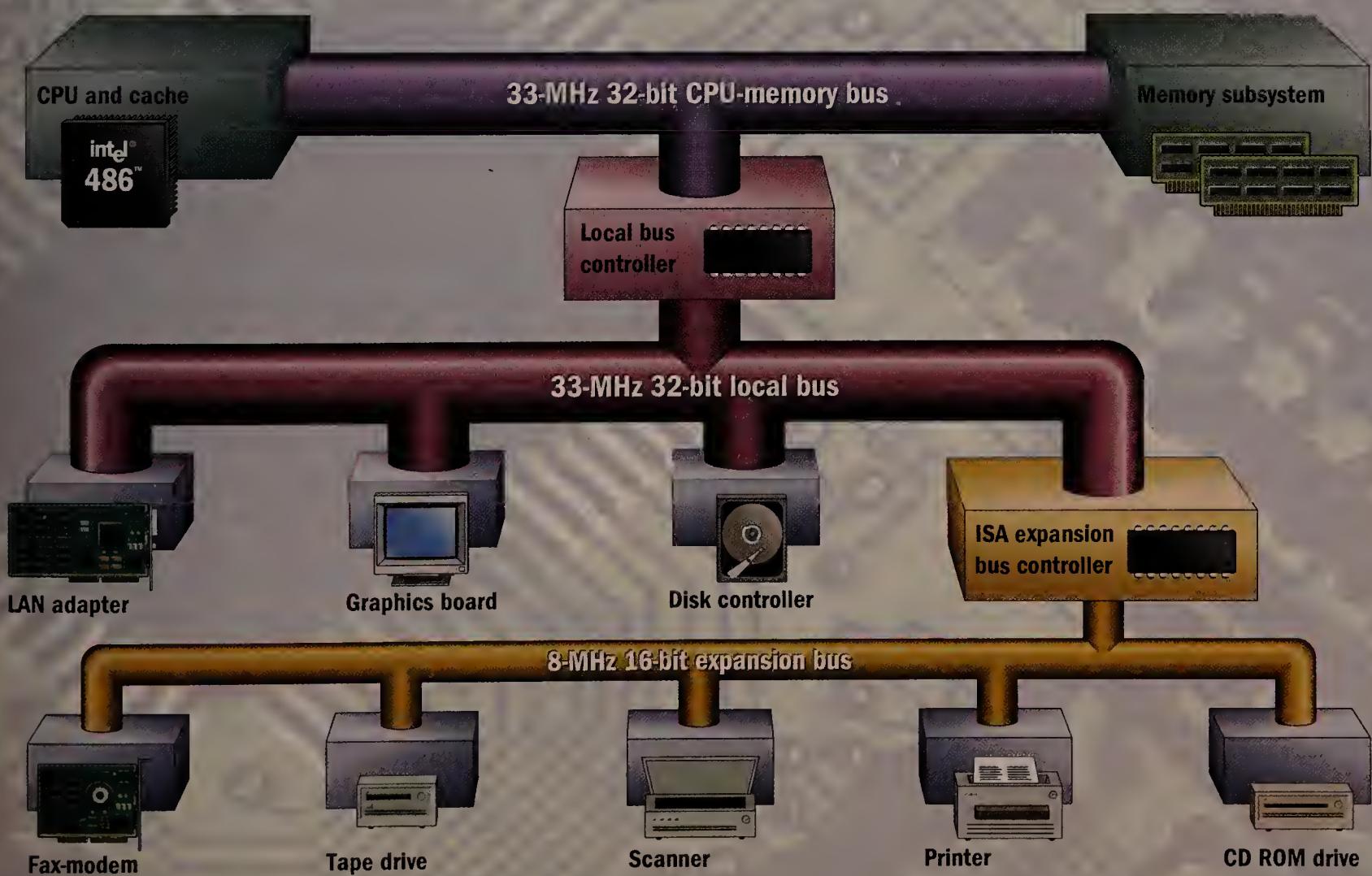
VESA chair Tom Ryan contends that VL's peripheral limitation does not hurt the usefulness of the standard, and he says the architecture is well suited to its mission. "It doesn't seem to be a problem at the moment. You're not going to put your I/O port on the VL bus," says Ryan. "And we're not putting LAN on the local bus, because ethernet is constrained by other factors."

Others see VL as a standard with distinct limitations. Citing technical compromises in the VL bus design, *PC Graphics Report* editor Fred Dunn sees a short life span for the new standard. "There seems to be a consensus among the system manufacturers that VL is a short-term solution, and that PCI will be here in the long term."

Aside from limitations on the number of peripherals, VL has trouble with the close signal loading and timing tolerances of processors running faster than 33 MHz , where things happen so fast that even minor variances degrade performance. According to engineers, the simple, unbuffered VL design results in processing delays, called *wait states*, when speeds climb past 33 MHz.

The VL bus may fall short of perfection, but our tests show that the first VL systems are turning in remarkable scores. The $2995 Gateway 2000 486DX2-66V is a case in point. With an ATI Graphics Ultra Pro VL bus adapter and VL IDE disk controller, the Gateway turned in excellent performance on both our graphics-rich *Win-*

Local bus architecture



dows test suite and our disk-intensive database retrieval test.

The low-cost performance of the VL standard has caught fire with system vendors, as firms from Acer to Zeos have introduced VL computers. In fact, some vendors have gone so far as to build VL bus into all their ISA-based machines.

"As soon as we introduced our VL line, we discontinued our ISA line," says Rick Apple, vice president of marketing for Zeos Int'l. "There's nobody who doesn't want local bus. And we're not charging any extra for it."

Raging Bus Wars

	VL bus	PCI bus
PROS	Systems available now Low cost Numerous add-in card vendors Performance test data, reviews available Backward compatible to ISA/EISA/MCA	Supports ten peripherals 64-bit support for Pentium systems Fewer incompatibilities Backed by Intel and other industry leaders Add-in cards expected Auto-configuration features on boards Backward compatible to ISA/EISA/MCA
CONS	Handles only three peripherals reliably Questions about stability/compatibility No set upgrade path to Pentium Problems at clock speeds over 33 MHz	More expensive than VL bus Systems not yet widely available No testing data available

PCI: Foundation for the Future

Most industry experts would back up Rick Apple's claim that VL is more than adequate for today's computing needs. But many agree that upcoming computing challenges—one, two, five years in the future—will demand a more sophisticated and expandable standard.

Unlike VL and proprietary bus schemes, PCI puts a complex managing layer between the CPU and peripherals to streamline data transfers and present a uniform bus interface. Often called an "intermediate" bus, this layer buffers signals, letting PCI support ten peripherals (but a maximum of five add-in cards) and maintain maximum performance at high clock speeds. In addition, PCI supports bus mastering, which enables intelligent devices to take control of the bus and accelerate high-throughput, high-priority tasks.

While PCI's maximum sustained throughput on 33-MHz systems is lower than VL's—120MB per second versus VL's 132MB—it's still three times faster than EISA's or Micro Channel's. And like those older buses, PCI supports a burst mode that shoots large chunks of data across the bus in a flash—especially useful in quickly displaying a high-resolution image with millions of colors.

When it comes to the speed of individual tasks, however, neither VL nor PCI will enjoy a clear advantage, predicts Michael Slater, editor of the *Microprocessor Report* newsletter. "The choice between VL and PCI is not really a performance question. I think you will be able to pick PCI systems that are faster than VL systems, and VL systems that are faster than PCI systems."

Where PCI shines is in its sophisticated design and ease of use. Intel's standard offers features such as auto-configuration, which lets the peripheral adapter interact with the system at installation and determine interrupt settings and software defaults. Similarly, PCI's buffered design doesn't run faster than 33 MHz, avoiding critical timing problems and ensuring consistent adapter designs. The result is a more stable interface between peripherals and bus.

Still, the functionality and complexity of PCI carry a price. The cost of silicon to control the bus will likely inflate system pricing—at least until sales volume brings premiums down to earth. And the late arrival of many peripheral makers into the PCI camp could make board selection sparse for several months, raising prices further.

Mike Schmidt, marketing manager for Gateway 2000, says PCI must define itself to overcome VL's lead in the market. "It will be interesting to see how it works into a cost-benefit analysis. VESA is a very low-cost, high-benefit option. PCI is going to have to match that if it is going to replace VESA."

PCI enjoys some big-name support, and even VL boosters are hedging their bets by beginning development for Intel's architecture. ATI has been developing products for both VL and PCI, and IBM will likely put VL architectures on its low-cost Value Line systems while going with PCI on its PS/2 products. Even staunch VL players like Hyundai, Gateway, and Diamond say they are keeping a close eye on PCI development. And with an add-in card design finally approved by the PCI special interest group, the standard is attracting interest from peripheral makers. With the line between who supports VL and who supports PCI blurring, buyers will have even more hardware options.

With the line between who supports VL and who supports PCI blurring, buyers will have even more hardware options.

Applications for Tomorrow

If local bus is the future of computing, which applications will the local bus serve? Full-motion video is the most commonly cited beneficiary—but few users can imagine it being a

vital application, even with the recent introduction of Microsoft's *Video for Windows*. The real benefits may not surface until Windows NT and OS/2 applications begin to take advantage of the environments' multitasking capability. When smart applications perform such tasks as sending and receiving faxes, backing up files, and formatting documents in the background, you may need a local bus system to keep the applications running at their potential.

Designed to accommodate the 64-bit data path and high clock speeds of the Pentium processor, PCI is poised to become the definitive standard for next-generation computing. PCI's support for as many as ten peripherals, bus mastering capability, and standard bus interface make it an excellent platform for several peripherals performing multiple tasks simultaneously.

"If you look at the list of people supporting PCI, of course we have most of the major OEMs and vendors," says Intel's Mike Bailey, who is marketing manager for the PCI division. "But we expect a lot of the people who make add-in cards to jump in now. It's to be expected. VL is certainly out there, so it would be almost foolish for somebody not to support VL. But we feel that is in the interim."

Still, the strength of both standards will depend on the quality and selection of peripherals built around them. For end users choosing between VL and PCI, that means looking beyond standards and throughputs and considering the selection of boards made to each standard.

Confusing as it can be, local bus technology presents a win-win situation for buyers. Even the most limited proprietary systems can improve graphics performance and open the road to emerging multimedia and video-based applications. VL bus and PCI can only build on that improvement, opening opportunities for effective multitasking, faster disk access, and high-speed LANs. For anyone considering a new PC, either standard opens a vital path to future applications.

Michael Desmond is an assistant editor for PC World. *He can be reached on PC World Online (see page 8 for more information).* ■

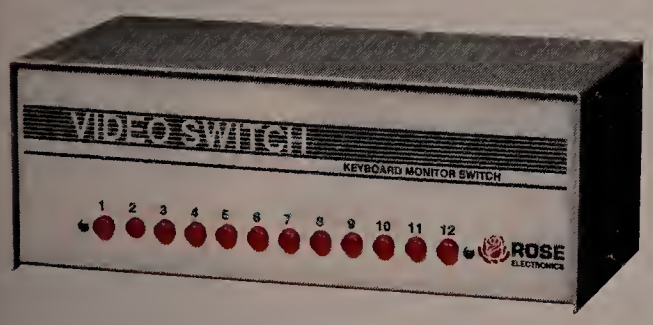
How the Bus Standards Stack Up

	ISA	EISA	MCA	VL	PCI
Maximum bandwidth (bits)	16	32	32	32	32[1]
Maximum clock speed (MHz)	8	8.3	10	33	33
Maximum sustained throughput (MBps)	16	32	40	132	120
Number of peripherals	>12	>12	>12	3	10

[1] Also supports 64-bit bandwidth for Intel's Pentium processor.

Your Choice of Keyboard Monitor Switches

Access multiple computers with a single keyboard and monitor to cut equipment costs, save valuable space, and end clutter



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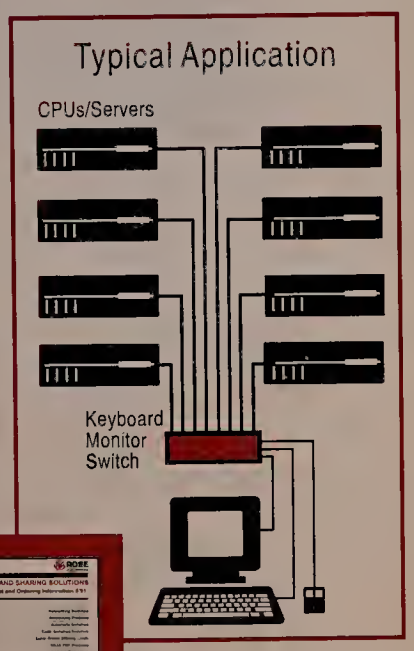
- Optional RS232 or PS/2 mouse interface
- PCB construction for high reliability and low crosstalk
- Rack mount, matrix, and customized units available



- Switch by keystroke, from front panel, or RS232 port
- Two or four ports per unit
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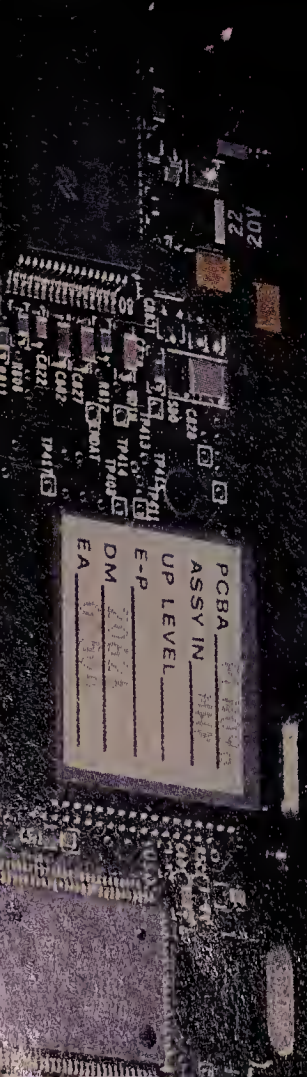
Buyers' Guide

200MB Hard Disks

It's true: Data does expand to fill all available space. Put off the inevitable and choose one of the 14 produc



TRACY ALEN AIKEN

Trying to run *Windows* and its applications on a 40MB to 80MB hard disk is a lot like trying to squeeze six passengers into a Ford Fiesta. It just won't work. You're either going to have to buy a bigger car or someone's going to have to walk.

If you're feeling the hard disk pinch these days, a 200MB to 250MB hard disk could be just what you need, letting you and your data breathe a sigh of relief. But why choose a 200MB to 250MB drive rather than a less-expensive 100MB to 120MB drive?

For starters, as "How to Stuff a 120MB Hard Drive" shows, *Windows* requires a lot of space. *Windows* system files take up 12MB or so, *Windows* apps consume another 15MB each, swap files require 4MB, and then you need room for those massive TMP files. Of course, even when you're running *Windows*, you still need to accommodate DOS and those DOS applications you're still using. Add some fonts, clip art, assorted utilities, and data files, and you've got a pretty crowded hard disk.

And that's just today. Tomorrow's operating environments, such as Windows NT, will make even greater demands. Data-intensive applications, such as multimedia, voice mail, fax software, and next-generation graphics programs, with their multimegabyte data files, will make the space crunch that much worse.

But assuming 200MB to 250MB is the right size for your current and future storage needs, which drive would be right for you? To help you decide, we gathered every 200MB to 250MB internal hard drive we could find that is available to the public through mail-order or retail channels. We excluded external models because internal

BY GEORGE CAMPBELL

ted in this complete guide to 200MB hard disks.

installation makes the most sense for the average business user with the average business user's cramped desk.

In the end, we found fourteen drives that qualified. While we weren't out to decide once and for all which drive is best, we wanted to look at these drives, and find out what it would be like to actually work with one every day.

A Question of Cost

The price of mass storage has dropped dramatically over the past few years. Once expensive specialty items, 200MB to 250MB drives are now priced like commodities. The least expensive drive here is the 213MB Maxtor IDE drive, which lists for $419; the most expensive is Core International's 230MB 3SHC230, which lists for $1395. (Core has a newer, cheaper drive that wasn't available in time to be tested.)

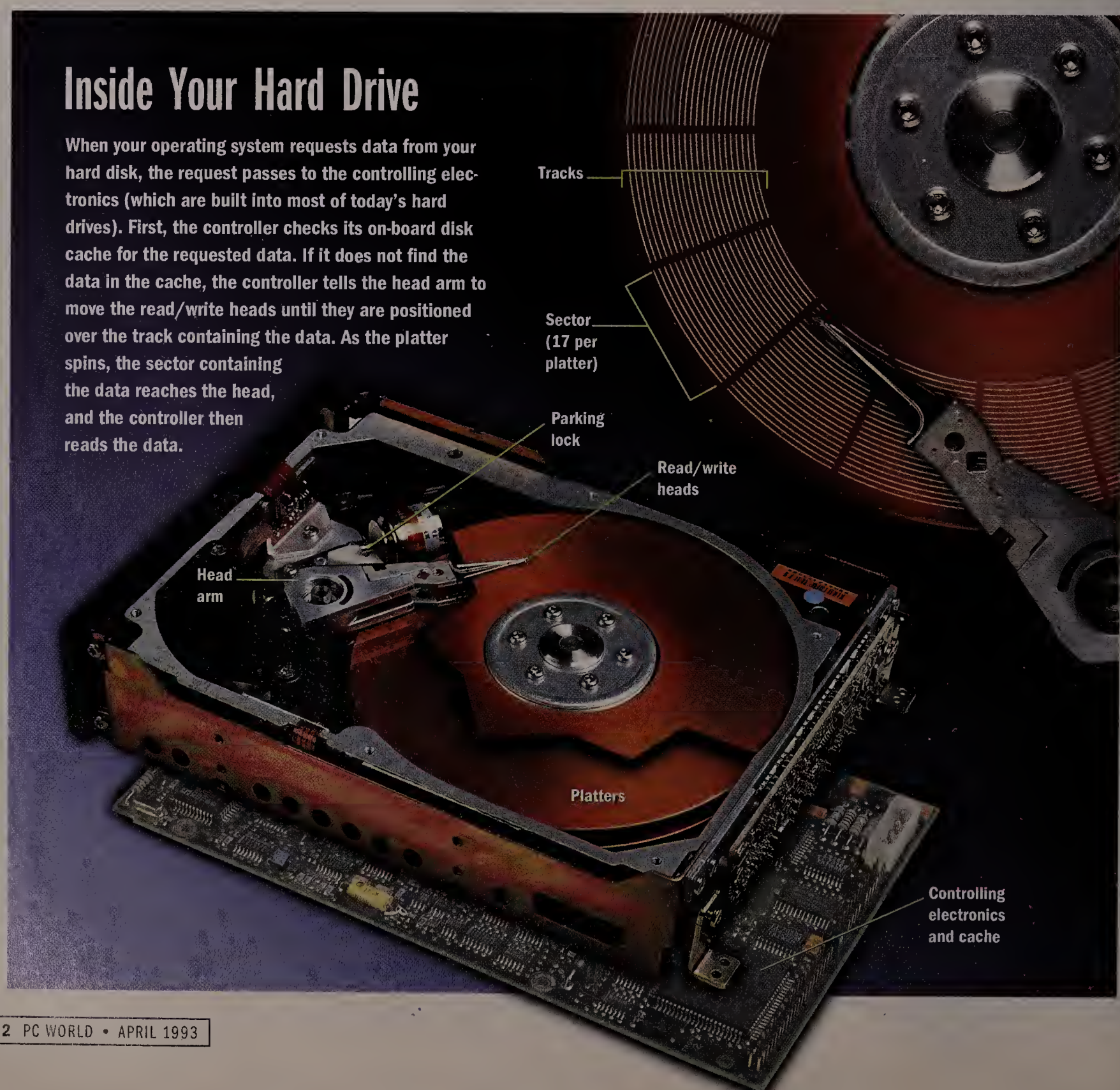
In addition to looking at list prices, we also checked street prices. For drives available through mail-order (the most popular sales channel for new drives), we calculated average mail-order prices. For those that aren't advertised, we've used vendor estimates. Once again, the Maxtor IDE drive was the least expensive, at $385 on the street, while the Core International drive, at $950 on the street, was the steepest. But remember: our street prices are only estimated averages—you could find these drives for less if you look hard.

These raw prices are not, however, the best way to judge hard drive value; you should consider the price per megabyte. Based on list price, the cost per megabyte of the fourteen drives we examined ranges from $1.97 to $6.07; calculated with the street price, the range is down around $1.96 to $4.13. Compared with 100MB to 120MB units, these spacious hard drives are a bargain; all else being equal, a 200MB to 250MB drive should cost at least 30 cents per megabyte less than a 100MB to 120MB drive.

Performance in the Real World

Drive speed has always been important, but now it's critical. That's because today's typical user relies heavily on graphics-based applications, running in an environment like *Windows* or OS/2. Both application and data files are larger than ever, and graphical user interfaces use your hard disk as virtual memory, swapping data freely between your hard disk and RAM.

Unfortunately, drive speed is a tricky thing to judge. Vendors pub-



JEFF BERLIN

lish a confusing variety of specifications, from average seek times to data transfer rates, and it's hard for the average buyer to know which number to note. That's why the PC World Test Center did some testing for you.

Our benchmarks were completed with the drives installed in a Compaq 386DX-25 with a standard ISA data bus. While the ISA bus is the most common, we also know it's not optimal for speed. Users with equivalent EISA or MCA bus machines (equipped with the appropriate host adapters) should, in theory, get better performance than we did. Also, local bus host adapter cards for these drives are just now coming to market and will take advantage of fast, direct access to the CPU to improve data transfer times.

Using many of the applications you use every day, *PC World* put these drives through their paces, performing typical operations on typical data files. The test report shows the results of two separate test suites. For the *Windows* figures, which represent elapsed time, lower numbers reflect better performance. The BAPCo scores, on the other hand, represent the number of times the system executed a test each hour, so higher numbers mean better performance.

Theory Versus Reality: Which Specs Count?

We found that the two most common vendor measurements of drive speed—average seek time and data transfer rate—had very little to do with actual performance. Average seek time gauges the time it takes the drive's heads to move from one data sector to another. The drives we tested have average seek times ranging from 12 to 16 milliseconds. But when we compared each drive's performance scores against the average seek time, we found no correlation. The Quantum drives, for example, whose 16 millisecond seek times are among the slowest here, were among the fastest in actual use.

Data transfer rates represent the speed at which data can be transferred from the drive platters to your system's memory. For the drives in this buyers' guide, these figures range from 1.4MB to 3MB per second. A related measurement, the burst transfer rate, measures the transfer rate for a block of data small enough to move to system memory in a single burst; this figure ranges from 4MB to 10MB per second.

Like average seek times, data transfer rates bear little relationship to real speed. In theory, drives with higher data transfer rates should perform particularly well in *Windows*, which requires the system to hustle lots of information from the disk to the system. However, while the Quantum Hardcard has the lowest data transfer rate drive here—1.4MB per second—it performed better than any other in our graphics-intensive *Windows* tests.

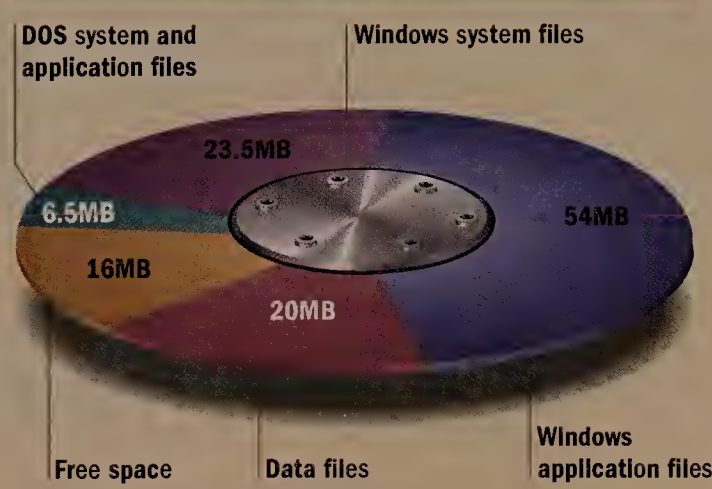
Though average seek times and data transfer rates turned out to have little to do with everyday performance, two other vendor specifications did: platter rotation speed and cache size.

While speeds of 3600 RPM were once the norm, today's drives now spin all the way up to 4500 RPM. Faster platter rotation should mean faster data transfer, because the drive can read a track of data more quickly, and it should also mean a faster average seek time, because the platter needs less time to get the desired sector under the read-write head. These theories are borne out in reality: If you sort these drives by overall speed, you'll find that the faster drives tend to be the ones with faster rotational speeds; it isn't an absolute rule, but the correlation is close.

How to Stuff a 120MB Hard Drive

Why do you need a 200MB to 240MB hard drive? Take a look at the chart below. While 120MB might take care of your immediate needs, what about two or three years down the road, when software and data files will both be bigger? A 200MB to 240MB drive will give you plenty of room now and in the future.

Application	Approximate space (MB)
DOS system and application files	**6.5**
MS-DOS 5.0	2.5
The Norton Utilities	2
Miscellaneous DOS programs	2
Windows system files	**23.5**
Windows 3.1 system	12
Permanent swap file	4
TMP files	4
50 TrueType fonts	3.5
Windows application files	**54**
Word processor	15
Spreadsheet	8
Database	15
Communications	5
Presentation graphics	11
Data files	**20**
Free space	**16**



The match is even tighter between the size of a drive's on-board cache buffer and its real-life speed. Once again, if you sort these drives according to our test results, you'll find that the fastest drives are usually the ones with the largest caches. The reason is simple. The larger the cache, the more likely the desired data is in it and reading from the cache is many times faster than reading from the disk.

Cache sizes for these drives range from 64K to 256K. In addition to reading the data requested by your operating system, "read-ahead" (or "pre-fetch") caching also collects the data from the drive sectors that follow, assuming that they'll be called on next. "Write" caching intercepts data written to the drive, holding it momentarily

If I'm terrified, will it show in my present
okay? What would happen if I put too mu
company logo be in every slide? Visuals
care? Can clip art help make things clearer
of bar charts? Do borders distract from the
me look professional, but not too stuffy
logos? Am I asking too many questions

on? Is white type on a black background
n or too little text on a chart? Should the
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Will anybody care if I use pie charts instead
message? Or me? Which typeface makes
but not too casual? Did I already ask about
Am I forgetting anything?

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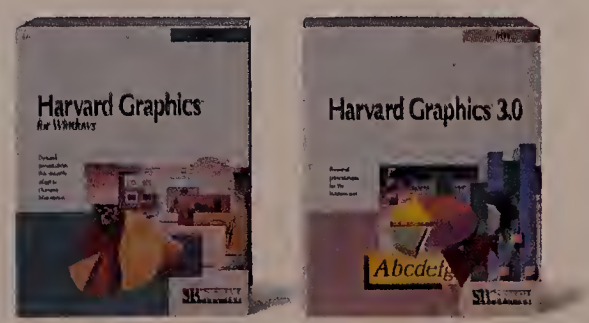

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until there's a pause in operations before writing to the disk itself.

Remember to keep our performance numbers in perspective. Overall, in both the BAPCo SYSmark92 rating and the *Windows* test suite, there's only about an 11 percent difference between the slowest and fastest drives. Some applications show a greater sensitivity to hard drive performance than others. In the BAPCo database tests the range between first and last place climbs to 29 percent. Similarly, the BAPCo software development and graphics tests show a 19 percent and 16 percent performance difference, respectively. In the *Excel* section of the *Windows* suite, the difference between the slowest and fastest drives was 16 percent. If you're using one of these applications, you should benefit from the added speed; otherwise, a faster drive won't help you boost your overall performance that much.

The performance winners? In the *Windows* benchmarks, the Quantum Hardcard EZ turned in the best overall performance, with the Conner Peripherals Cougar drive placing second, followed by the other two Quantum drives and the Seagate ST3283A. In the BAPCo SYSmark rating, the Conner drive topped the list, with the Seagate ST3283A coming in a close second, followed by the three Quantum hard drive entries.

Compatibility Factors

Unless you must have the fastest possible drive, performance is unlikely to be the only factor in your buying decision. Most buyers should also consider the drive's interface. Fortunately for today's buyers, the interface wars of the past are gone, leaving just IDE (integrated drive electronics) and SCSI (small computer system interface) drives in this size category.

So which interface is right for you? In our lab tests, we found that the type of interface had little impact on performance—the SCSI drives were a bit slower than the IDEs, but not enough that you'd notice in actual use. Where the interface really comes into play is in matching a drive to your system, which in turn depends largely on what kind of drive you already have.

Most systems sold today come with IDE connectors either built

200MB to 250MB Hard Drives: More Megabytes for the Buck

● = Yes ○ = No n/a = not available

Company	Model	KEY FEATURES: Formatted capacity (MB)	List price	Cost per MB	Estimated mail-order/street price	Rotational speed (RPM)	Buffer/cache (K)	Average seek time (ms)
CMS Enhancements 714/222-6000, 714/549-4004 (fax)	CMS Enhancements B240S5 N	248	$1169	$4.71	n/a[1]	4500	128	12
Conner Peripherals 408/456-4500, 408/456-4501 (fax)	Conner Peripherals Cougar CP-30204	213	$750	$3.53	$495	4500	256	12
Core Int'l 800/688-9910, 407/997-6055, 407/997-6009 (fax)	Core Int'l 3SHC230	230	$1395	$6.07	$950	3600	64	13
Maxtor 800/462-9867, 408/432-1700, 818/837-3662 (fax)	Maxtor 7213A Maxtor 7213S	213 213	$419 $419	$1.97 $1.97	$385 $385	3551 3551	64 64	15 15
Optima Technology 714/476-0515, 714/476-0613 (fax)	Optima Technology DisKovery S 200I/AT	240	$599	$2.50	$495[2]	4500	128	12
Perisol Technology 800/447-8226, 408/738-1311, 408/738-0698 (fax)	Perisol Technology DataSafe 213S	213	$980	$4.60	n/a[1]	3600	64	15
Procom Technology 800/800-8600, 714/852-1000, 714/852-1221 (fax)	Procom Technology ProPaq/s200x	213	$825	$3.88	$649	3486	64	16
Quantum 800/624-5545, 408/894-4000, 408/894-3275 (fax)	Quantum Hardcard EZ Quantum ProDrive LPS 240AT Quantum ProDrive LPS 240S	245 245 245	$749 $500 $554	$3.06 $2.04 $2.26	$599 $406[2] $450[2]	4306 4306 4306	256 256 256	16 16 16
Seagate Technology 408/438-6550, 408/438-4127 (fax)	Seagate Technology ST3283A Seagate Technology ST3283N	245 249	n/a[3] n/a[3]	n/a n/a	$552 $617	4500 4500	128 128	12 12
Western Digital 800/832-4778, 714/932-5000, 714/932-6498 (fax)	Western Digital Caviar WDAC2200	213	$490	$2.30	$433	3652	64	14

[1] Not available at press time. [2] Vendor's estimate. [3] Vendor does not publish list price.

in to the motherboard or on a card in one of the expansion slots. If that's the case with you, you'll want to get an IDE drive to replace or supplement the one you're using. Because every IDE drive is compatible with every IDE connector, replacing a new IDE drive is a simple matter of screwing it into the drive bay, attaching the cables, and reconfiguring your CMOS setup. Adding a second drive is only slightly more difficult.

SCSI drives are another story. There are two good reasons for buying one. If you're already using a SCSI drive, you'll want to replace or supplement it with another SCSI drive. You'll also want to go with SCSI if you plan to add several different storage devices (including more hard disks, CD ROMs, and for optical drives) to your system.

Unfortunately, installing a SCSI drive is notoriously tricky. The problem is that DOS and other common operating systems require a translation layer between a SCSI drive and the rest of the system. Because different adapters use different translators, your SCSI adapter and each SCSI device in your system must use the same translator. The solution: Take care to check with the vendors of your system and the new devices to be sure they'll be able to communicate with one another.

You'll also have to buy a new adapter if you're replacing one of the older drive typefaces (such as MFM, RLL, or ESDI), or if you want to switch from IDE to SCSI or vice versa. If you already have an IDE drive installed in your system, you won't need a new adapter. Vanilla IDE adapters start at less than $50, while their SCSI counterparts should cost about $50 more.

At one time, energy consumption was a major factor, but today's drives use much less power than older units; if you have a 200-watt or better power supply, you should have no problem.

Data transfer rate (MB/sec from disk to system)	Burst transfer rate (MB/sec from disk to system)	Cache type	INTERFACES: IDE	SCSI	SCSI-2	Height (inches)	Power consumption (watts)	MTBF (thousands of hours)	Warranty (years)	Warranty provider	Reader service number
3.0	10	read-ahead/pre-fetch	○	●	●	1	2.7–7	200	1	manufacturer	641
2.5	5	read-ahead/pre-fetch	●	○	○	1	5.2–6.6	150	1	vendor	642
1.5	5	read-ahead/pre-fetch, write	○	●	○	1.63	9.5–24	150	5	manufacturer	643
2.8	9	read-ahead/pre-fetch	●	○	○	1	3.5–3.7	150	1	manufacturer	644
2.8	7.5	read-ahead/pre-fetch	○	●	○	1	3.5–10	150	1	manufacturer	644
2.5	10	read-ahead/pre-fetch	○	●	●	1	3.5–5.7	200	1	manufacturer	645
2.0	10	read-ahead/pre-fetch	○	●	○	1	9–11	150	1	manufacturer	646
1.5	4	read-ahead/pre-fetch	●	○	○	1	6–16	100	1	manufacturer	647
3.8	5	read-ahead/pre-fetch, write	●	○	○	n/a	6–7	250	2	manufacturer	648
2.8	5	read-ahead/pre-fetch, write	●	○	○	1	3.8–12.4	250	2	manufacturer	648
3.8	10	read-ahead/pre-fetch, write	○	●	●	1	3.8–12.4	250	2	manufacturer	648
3.0	6	read-ahead/pre-fetch	●	○	○	1	3.5–5.7	200	1	vendor	649
3.0	10	read-ahead/pre-fetch	○	●	●	1	3.5–5.7	200	1	vendor	649
1.9	5	read-ahead/pre-fetch	●	○	○	1	2.9–10.5	100	2	manufacturer	650

For more information about all products in this table, circle reader service no. 900.

Remember that an *adapter* is not the same as a *controller*. All drives these days come with the controlling electronics built right in; all you need to connect the drive to your system is an adapter or motherboard connector. The main reason to buy a new controller is to improve your system's performance with a *caching controller*. A caching controller supersedes the drive's small on-drive cache with its own, larger cache (1MB or more). The result: increased data access speed, particularly for database or graphics apps. In system reviews, we've found caching controllers to be the single best way to boost performance, better even than added RAM or graphics accelerators. IDE caching controllers with 1MB of cache start at around $200 and, as with plain adapters, SCSI models should run you about $50 more.

If you want some indication of how long a drive will last, check the length of the warranty. Among the drives in this buyers' guide, warranties range from one to an astonishing five years.

What about installation? Since all these drives are 3½-inch, half-height or smaller units, you shouldn't have any problem fitting them into your machine. If you'll be using a 5¼-inch drive bay, though, you'll need a low-cost bracket to fit the smaller drive into the larger bay. Many vendors now include an installation kit, containing everything that you might need for the installation project, with every drive. For an even simpler installation, the Quantum Hardcard slips right into an empty 16-bit slot in your PC and comes with setup software.

At one time, energy consumption was a major factor, but today's drives use much less power than older units; if you have a 200-watt or better power supply, you should have no problem. Installation of any of these drives typically takes half an hour or so, with partitioning and formatting adding a bit more time.

How Long Will it Last?

You need a drive that will stand the test of time, since a drive that breaks a year after you buy it costs far more than one that lasts for several years. But how can you tell which drive's going to hold up?

One measurement is the drive manufacturer's mean time between failure (MTBF) rating. This figure is based on a statistical estimate of how long a typical drive will last without failing; the estimate is based on the failure rates that occur when the drives are operated under exorbitantly hostile conditions (such as high temperatures.). Considering that the MTBF figures of these drives range from 100,000 to 250,000 hours, you can see why real-life numbers are hard to come by; 100,000 hours is more than 11 years.

If you want some indication of how long a drive will last, check the length of the warranty. The warranty period represents the manufacturer's confidence level in the drive. Among the drives in this buyers' guide, warranties range from one to an astonishing five years (from Core International).

Check with your dealer about the specifics of the service contract. When does the warranty period begin—when *you* buy the drive, or at the time the *dealer* bought it from the manufacturer? Quantum has one of the best warranties in the industry: If your drive fails while under warranty, you get a refurbished unit and the warranty period on the replacement unit restarts.

The point is that warranty policies can vary from dealer to dealer for the same drive, so shop carefully. For example, you may pay less for a given drive at one dealer than another, but the lower price may mean a shorter warranty period. (For more advice on hard drive service and support, see March 1993's *Consumer Watch* column.)

Warranty is not the only thing that varies according to where you buy your drive. Price, technical support, and other elements of customer service change as well, depending on whether you buy through mail-order, from a local dealer, or, in at least one case, from the drive-maker itself.

Mail-order is the most popular channel for selling hard drives. In fact, a few mail-order firms (such as Computer Products Corp., DC Drives, Hard Drive Super Source, Hard Drives International, Mega Haus Hard Drives, and Storage Devices Inc.) sell nothing but hard drives. These vendors have the advantage of offering a wide range of models, plus their support staff is tailored specifically to the hard drive customer. General mail-order vendors may have competitive prices, but their support will probably not be as thorough as a specialist's. The downside to buying mail-order is that getting warranty service or a replacement can take some time. Also, mail-order companies may not be much help if you have trouble installing the drive; being talked through the procedure over the phone is much harder than having a service technician at a store do it for you.

That kind of hands-on help is the major advantage of buying from a local dealer. If you're at all nervous about taking off your system's case, this could be a compelling argument in favor of buying locally. A local superstore will likely offer better prices than a smaller shop; superstore prices may, in fact, be better than mail-order vendors'. Smaller retail outfits offer the advantage of personal service. The problem with all local dealers, from superstores on down, is that few of them are likely to offer the same choice of drives you can get via mail-order.

At least one drive manufacturer, Quantum, sells direct to end users. Unfortunately, they do so at the full list price. Buying direct from the manufacturer does have the advantage of direct access to first-hand technical support.

No matter where you buy, be sure you're getting all the hardware and manuals you need. Because hard drives were originally sold to system vendors only, drive manufacturers did not develop the kind of end-user amenities, such as documentation, that other peripheral-makers gave their buyers. Be sure to ask the vendor what comes with your new hard drive: Do you get assembly instructions? What about mounting hardware? You should also be sure that the warranty period is what you want, and that, if you have any problems, you'll be able to replace the defective drive quickly.

Making the Choice

Some drives we tested combined reasonable price, good performance, and reliability and stacked up at the top of the list. The Conner Cougar CP-30204, for example, performed well in our tests and has an attractive price. The mid-priced Quantum Hardcard bested the others in the *Windows* performance tests and offers the installation plus a two-year warranty. The other two

Quantum drives also offer good performance, reasonable prices, and that same two-year warranty. The Maxtor IDE and SCSI drives' low overall cost and cost per megabyte make them enticing if you're on a budget, even with their limited one-year warranties and mid-range performance figures.

Another way to decide on the right drive for your system: Check out what everybody else is buying. According to market research by IDC, Maxtor and Quantum each commanded 23 percent of the 1992 U.S. market for 200MB to 299MB hard drives. Conner followed wtih 17 percent market share, Western Digital held 15 percent and Seagate trailed with 9 percent. Other market research firms come up with different figures, but those same five vendors led the market as a whole.

Our experience at *PC World* supports the IDC findings. Of the 150-plus desktop systems we've reviewed over the past six months, almost 30 percent used Maxtor hard drives. Another 20 percent used Quantum drives, while 15 percent each used Conner, Seagate, and Western Digital.

While the PC World Test Center's measurements demonstrated some performance differences among drives of this capacity, the ranges weren't as large as you might expect from the raw manufacturer's figures, and they seem quite unrelated to prices. Whichever of these 200MB to 250MB drives you choose, you'll get acceptable performance, plus plenty of space for your applications and data, now and in the future.

George Campbell is a contributing editor for PC World. *He can be reached on PC World Online as PCW George (see page 8 for more information). Hard Drives International assisted* PC World *in obtaining drives for testing.*

PC WORLD TEST CENTER REPORT

Conner Cougar Outruns the Rest

	Freelance for Windows 1.0	Paradox 3.5 in DOS window	Word for Windows 2.0	Excel 4.0	BAPCo SYSmark92
Conner Peripherals Cougar CP-30204	405	379	371	338	51.39
Quantum Hardcard EZ	402	357	368	331	50.01
Quantum ProDrive LPS 240AT	409	384	374	345	51.11
Seagate Technology ST3283A	406	400	372	339	51.23
Quantum ProDrive LPS 240S	409	384	374	345	50.11
CMS Enhancements B240S5-N	414	397	376	349	48.82
Western Digital Caviar WDAC2200	415	399	376	349	48.68
Perisol Technology DataSafe 213S	430	385	392	373	49.78
Maxtor 7213A	411	413	376	347	47.76
Optima Technology DisKovery S 200I/AT	435	405	394	379	49.00
Seagate Technology ST3283N	435	426	396	380	49.18
Procom Technology ProPaq/s200x	419	428	380	357	47.27
Core Int'l 3SHC230	437	403	397	382	47.43
Maxtor 7213S	446	401	402	393	45.81

All test results in seconds (lower is better) except for the BAPCo test results, which measure scripts per hour (higher is better). Drives listed in order of overall performance.

Methodology
We installed the drives in one of four Compaq Deskpro 3/25i's. Each system was configured with 4MB of RAM. For IDE drives, we used the systems' integrated Compaq IDE adapter; for the SCSI drives, we used whichever adapters the vendors supplied. We used FDISK and FORMAT to prepare each drive for the maximum available space provided by FDISK. We then loaded DOS and various applications. For the *PC World Windows* test suite, we activated *Windows'* SmartDrive 4.0 disk caching software, using the default settings. Per Microsoft documentation, we enabled SmartDrive's double-buffer setting for all SCSI drives.

Excel 4.0
We perform several data extracts, build and format a financial statement from scratch and print it out; and open a mortgage analysis, then scroll, move blocks, change the interest rate, print-preview the statement, and save the worksheet.

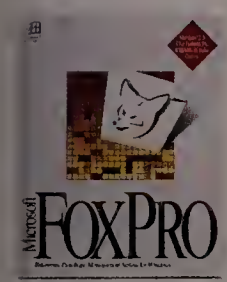
Word for Windows 2.0
We spell-check a 27-page document, then scroll through it. We create, format, print, and save a single-page business letter. We open an existing 9-page business proposal, add a new paragraph, print-preview each page, and then save the document under a new file name.

Freelance for Windows 1.0
We load a single-page starter file (built from a standard template included with *Freelance*) containing a U.S. map with each state as a separate object. Then we enter preformatted text on the page in preset headings, add a second page, and enter text as bullet items. We add three more pages, each containing a single 3-D bar chart from data imported from a *1-2-3* WK1 file. We add a sixth page containing four 3-D pie charts and preview the slide show using a vertical-louver fade effect between slides. We apply various views to the presentation and preview the slide show four more times, applying a different fade effect between slides each time. Finally, we save the presentation file to disk.

Paradox 3.5 in a DOS Window
Running the program in a DOS window, we access a customer database. We browse existing records, add new ones, and query, search, and sort the data. Finally we generate a report and save it to an ASCII file.

Data based on the BAPCo Sysmark92 test suite and on *Windows* tests designed and conducted by the PC World Test Center. All rights reserved.

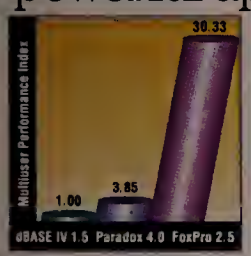
Since the beginning of time, people have been obsessed with reaching ever increasing rates of speed. So what else is new with Microsoft FoxPro 2.5?



Plenty. For starters, the new Microsoft® FoxPro® 2.5 for Windows™ has a rich and productive environment with an intuitive graphical interface. So it's never been easier for you to use and develop powerful database applications.

Plus there's a virtual hardware store of tools for both developers and users.

For developers, there are professional tools like Trace and Debug windows, Project Manager, Menu Builder, Screen Builder, and Report Writer. And each one is designed to help you create the most powerful applications possible.

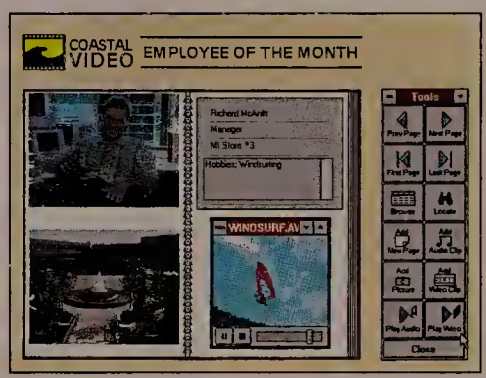


*Microsoft FoxPro version 2.5 is the fastest PC database management system available today.**

For users, there are lots of handy tools that make it easy to do complex database tasks without programming. Like Relational Query By Example (RQBE), which allows you to build and see queries instantly. Or the graphical Browse tool, an intuitive way to view data.

And with the arrival of FoxPro 2.5 for both the Windows and MS-DOS® operating systems (and soon for the Macintosh® and UNIX®), you can have the most powerful and most graphical Xbase applications across all major PC platforms.

And if you are thinking about migrating to Windows in the future, have no fear. Microsoft FoxPro for Windows will easily run all your FoxPro 2.0 files.



FoxPro 2.5 takes advantage of Windows and allows you to create dazzling applications.

But no matter which platform you choose, you can count on the new Microsoft FoxPro 2.5 to provide you with the fastest PC-based database management system available today.

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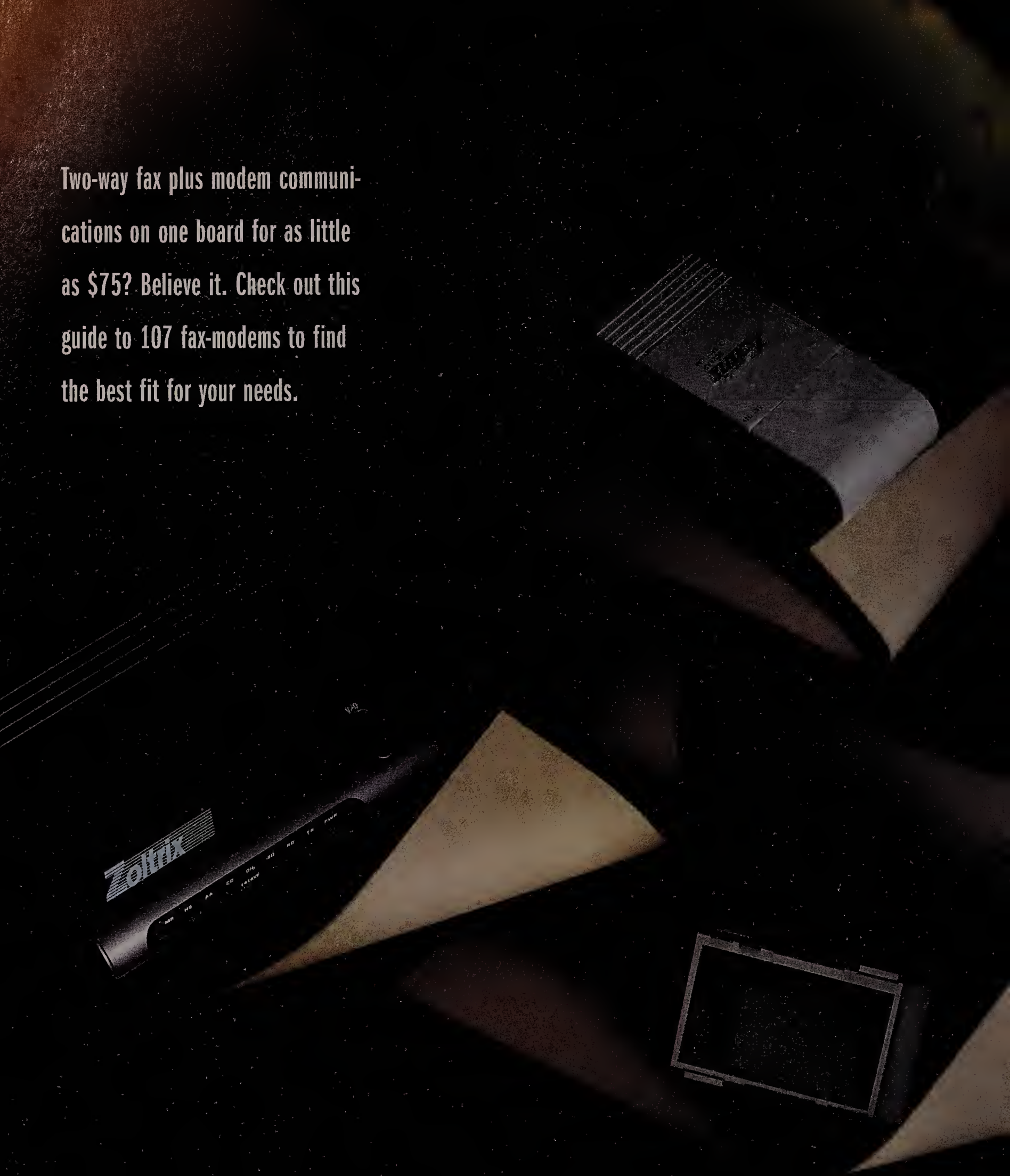
Two-way fax plus modem communications on one board for as little as $75? Believe it. Check out this guide to 107 fax-modems to find the best fit for your needs.



Clockwise from left: Zoltrix's 144e desktop and Pocket 96 models and AMT's Starcard 2442fx PCMCIA card.

FASTER, CHEAPER FAX-MODEMS

A colleague once illustrated the irony of the fax machine by saying there are times when overnight mail would be faster. The hang-up is usually the company fax handler, a harried assistant who sends everyone's documents between performing other tasks and sometimes takes ages. My friend discovered that with a fax-modem and software, her computer could serve as a personal fax machine. Now she wonders how she got along without a fax-modem.

Despite our colleague's experience, these modems aren't the fax panacea. For example, a fax machine is actually easier to use for documents that don't begin life on a computer. To send these documents with a fax-modem, you would first have to scan them. Yet fax-modems have unique conveniences. One of the most popular is group faxing, where the computer performs the mind-numbing task of sending the same fax to many people. Computer fax systems also keep records of

BY BRYAN HASTINGS

MICHELLE CLEMENT

sent and received faxes, and let you schedule faxes for later transmission without tying up a machine with pages. Perhaps best of all is the ability to fax the file you're working in—usually from your application's Print menu. Nothing beats the simplicity of a fax machine, but for certain tasks, nothing beats the convenience of a computer fax system.

Fax convenience at a good price is easier than ever to find. Fax-modems for less than $300 didn't exist three years ago, but for this guide, vendors answered our call with 107 candidates. All types are represented here: externals, pockets, expansion cards of varying lengths, and proprietary internal cards for portables. The speed of the products ranged from 2400 bits per second (bps) for modem-to-modem data (nonfax) communications to 9600 and 14,400 bps for both fax and data. Even a few of the new "credit-card" PCMCIA modems squeezed in under our price limit. The prices listed are manufacturer's suggested retail; you'll find most of these modems for $250 or less on the street.

Fax-Modems and Fax Software: Trials of a Young Marriage

PC-fax technology is young and restless. Several years ago, fax-modems worked only with software specially written for them, and many an off-brand modem still spurns all fax programs except the one it comes with.

The Class I standard was the first serious attempt to match fax-modems and programs, but uneven implementation still keeps some Class I modems and programs from talking to each other. Furthermore, Class I systems place almost all the fax processing burden on the computer, which often means you can't use your PC while it's sending or receiving. Class II was meant to clear up ambiguities and push some of the processing load onto the modem. Manufacturers clamored for the new protocol but the standards agencies dallied, so chip makers, hardware manufacturers, and software developers plunged ahead with a pre-ratified Class II specification, liberally doctoring the recipe with their own features. The result is that Class II modems and programs, while more efficient than Class I, are less compatible. Meanwhile, Intel stepped in with its Communications Application Specification (CAS), which dozens of fax-modem and fax program vendors adopted, mostly in addition to Class I, Class II, or both.

Which fax convention to choose? Your trade-off is top performance versus broad compatibility.

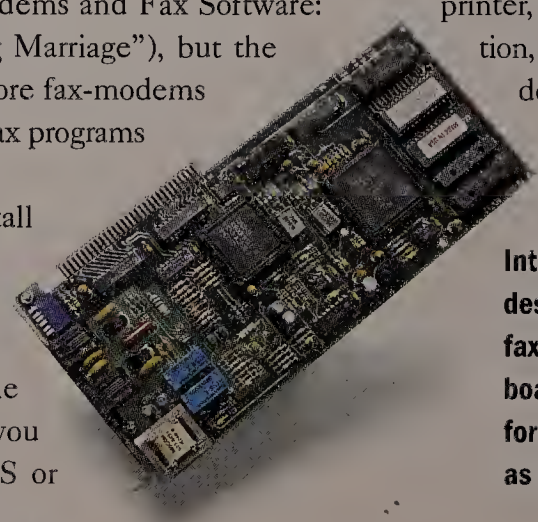
Like Class II, CAS shifts some fax processing to the modem, freeing the computer to do other things. Expect CAS to fade from the scene, however, over the next few years. It is not a true standard, and its prime backer, Intel, has declared its intent to support the T.611

Which Fax-Modem for You?

A few years ago, your choices in a fax-modem were few, and they ranged from fair to abysmal. All that is changing rapidly. Modem chip makers now offer fax-data chips at little or no extra cost over their data-only counterparts, so modem manufacturers by the dozen started popping them into their new products, and emerging computer fax standards make mixing and matching modems possible. Multiple conventions still plague the computer fax world (see the sidebar "Fax-Modems and Fax Software: Trials of a Young Marriage"), but the upshot is this: More fax-modems work with more fax programs than ever before.

Before you install a fax-modem system, make sure you have the computer for the job. Whether you decide on a DOS or *Windows* fax program, we recommend at least an 80MB hard drive.—fax files are graphics files that can gobble up more than 200K of disk space for each page sent or received. If you opt for a *Windows* fax program, we recommend at least a 386DX computer with 4MB of RAM.

Your next consideration is software, the most important part of a computer fax system. You're rarely stuck with the fax software that comes with better fax-modems these days, so shop around. Find the fax and data programs that appeal to you and best suit your needs. Given the choice, we recommend fax software for *Windows*. These programs come replete with features such as on-screen viewing and editing of faxes, the ability to print the fax on your printer, and optical character recognition, which converts your fax into a document editable by your word processor.



Internal desktop fax-modem boards sell for as little as $50.

The next step is to make a decision between an external and an internal fax-modem. Feature for feature, fax-modem cards usually cost less than external models, and they don't clutter your desk. However, you can easily install an external modem and quickly swap it between computers, and its status lights keep you informed on the state of your connection.

Buying a fax-modem for a portable PC raises different issues. You have three types of portable modems to choose from: an external pocket-sized unit that can run from a battery, an internal proprietary modem card that plugs into the bus, and, most recently, the PCMCIA (Personal Computer Memory Card International Association) 2.0 modem card, which looks something like a fat credit card.

Unlike those for desktops, proprietary modem cards for portables tend to be more expensive than the pocket variety because they have to be specially designed to fit into the smaller proprietary expansion slots in laptops and notebooks. Not only do you pay more for an internal portable modem card, but you probably won't be able to use it in a different portable PC. Still, they have their advantages—there's one less thing to remember to pack for a trip, and you can't forget it in a hotel room. Also, it has no battery to conk out while you're transmitting a long report.

standard, which the company believes will eventually supersede CAS.

Which fax convention should you choose? Your trade-off is top performance versus broad compatibility. If you send many faxes each day but can't afford to have your computer tied up, or you want to take full advantage of multitasking by using a *Windows* fax program, then choose a Class II or CAS modem. Be prepared, however, to be restricted to a smaller pool of compatible modems and software, and, in the case of CAS, to have manufacturer support for it slowly ebb away. If you want to equip a large work force with a variety of computers and fax-modems, then Class I products make more sense. The good news is that Class II finally became a formal standard last November, so new Class II products should be much more compatible than previously.

In the final analysis, don't take a manufacturer's word that its fax-modem will work with any program that shares the same convention, even Class I. Ask the vendor if the company has tested the modem with the fax program you want. Even if the vendor says yes, make sure you have a money-back guarantee. The only way to know you've got a good match is to see it for yourself.

If you have a late-model portable computer with a PCMCIA 2.0 slot, you may want to opt for the latest marvel of miniaturization—the credit-card size modem. Most such modems conform to the PCMCIA 2.0 standard and work with any computer that has the appropriate slot, which dozens of portables have. Credit card modems are expensive, however; all PCMCIA modems listed here offer only 2400 bps for data and 9600 bps for fax. And their phone jack adapters are one more thing to remember for the road.

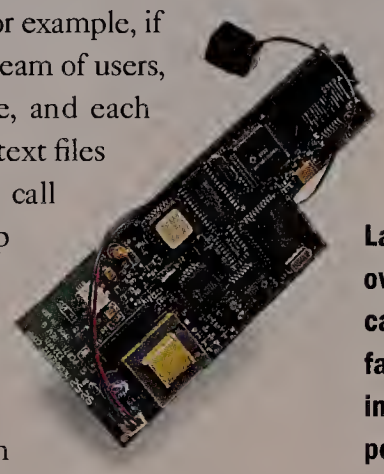
Life in the Fax Lane

The next issue is speed. Picking the right fax speed is easy enough: you have a choice of 9600 or 14,400 bps. The vast majority of the fax machines in use today are 9600 bps, so most likely that's all the speed you'll need for the next few years.

Whether you go with the faster fax-modem depends on your data needs, since fax-modems are available in only a few combinations of fax and data speeds. If you are a casual BBS browser, a 2400-bps data/9600-bps fax-modem is an option—it lists for as much as $200 less than a 9600/9600-bps fax-modem. If you send lots of data files, however, consider jumping right to the top and purchasing the fastest modem available: 14,400/14,400 bps. Often these list for just slightly more than their 9600/9600-bps counterparts.

Choosing the right data speed can be tough. Not only do you have three to choose from—2400, 9600, and 14,400 bps—but you also have a selection of data compression techniques, which can boost your throughput, and error-control techniques, which keep your data from becoming corrupted during transfers.

Soon 9600-bps will become the most common data speed in modems, but there are situations in which 2400 bps is appropriate. For example, if you need to outfit a large team of users, such as a field sales force, and each sends only a few pages of text files each day, such as daily call reports, then 2400 bps is up to the task and makes good economic sense.



Laptop owners can fit a fax-modem in their portables.

The table lists the six most popular error-control and data-compression standards and protocols. Like XMODEM and its kin, these error-control methods ensure that the file being transferred doesn't arrive corrupted, but even better, they protect it automatically. No modem should be without at least one of the two error-control conventions listed here. Try to purchase a modem with V.42, because it includes MNP 4 and tosses in a lesser-known but still prevalent protocol called LAP-M. If you're planning to send a lot of data over cellular phone, consider an MNP 10–equipped modem.

Data compression squeezes data down in the sending modem and expands it in the receiving modem, resulting in faster transmission rates. Beware of some vendors' outlandish data speed claims, however. Boasts of 38,400 bps or 57,600 bps are only peak, not average, speeds. A 9600-bps modem with V.42bis four-to-one data compression attains 38,400-bps throughput in bursts, but the average speed is much slower and depends on the type of file you send. Text files, for example, compress less than spreadsheets, so their average rate is less. In the table, the peak compression ratios are noted in parentheses for each of the data compression standards and protocols listed. The greater the ratio, the greater the peak compression and the better the throughput. V.42bis offers the greatest compression, followed by MNP 7 and MNP 5.

Making the Right Match

Finally, you have to make sure your modem works with your set of communications programs. That's usually not an issue for data; virtually all data communications programs and modems work together without a hitch. However, getting fax programs and modems to match can be tricky, as "Fax-Modems and Fax Software" explains.

You may find other modem details are important. Does the modem have a power switch? All internal modems turn on and off automatically; some pocket modems do, too. In a pocket modem, automatic power on/off means never running down your battery because you forgot to switch off the modem. Does the modem have two phone jacks? A second jack lets you keep the modem and phone hooked up at the same time, so you don't have to constantly hook and unhook phone lines. Some modems are set up so that one jack shuts down when the other is busy so that a transmission will not be ruined if someone reaches for a phone attached to the modem.

The final consideration for buying a fax-modem? Now is as good a time to buy as any. Faxing from your computer is not only easier than ever, it's affordable.

Bryan Hastings is an associate editor for PC World. He can be reached on PC World Online (see page 8 for more information).

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Circle 50 on reader service card

Fax-Modems for $300 and Less

● = Yes ○ = No
n/a = not applicable

Company	Product	List price	Form	SOFTWARE Fax	SOFTWARE Data	SPEED Fax	SPEED Data
Adtech Micro Systems 510/659-0756	DataFax 9624Vi	$99	ISA half-card	Phoenix	Phoenix	9600	2400
	Hi-Per 14/14	$299	ISA half-card	Phoenix	Phoenix	14,400	14,400
	Externally 14/14	$299	desktop	Phoenix	Phoenix	14,400	14,400
	Comm-panion 9696	$298	pocket	Phoenix	Phoenix	9600	9600
Addtech Research 510/623-7583	PC Mate 9600/2400	$149	pocket	BitFax	BitCom	9600	2400
Advanced Microcomputer Systems 800/972-3733	Xpress 42P	$85	pocket	QuickLink II	QuickLink II	9600	2400
	Xpress 144PC	$275/$299[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	14,400	14,400
	Xpress 42MC	$89	MCA card	QuickLink II	QuickLink II	9600	2400
	Xpress 42PC	$75/$105[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600	2400
American Data Technology 818/578-1339	SF-9624-PCM	$128	ISA half-card	SmartFax	Comm90	9600	2400
	SF-9624-PKM	$158	pocket	SmartFax	Comm90	9600	2400
	SF-1496-SA	$279	ISA ⅔-card	SmartFax	Comm90	9600	14,400
AMT International Industries 714/375-0306	AMT Star 2496	$169/$199[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600	2400
	AMT Starcard 2400fx	$269	PCMCIA 2.0	QuickLink II	QuickLink II	9600	2400
	AMT Starcard 2442fx	$299	PCMCIA 2.0	QuickLink II	QuickLink II	9600	2400
Andgate Systems 714/468-3084	Nicetalk NT 1414vi	$299	ISA half-card	BitFax	BitCom	14,400	14,400
	Nicetalk NT 9624m[4]	$139	pocket	BitFax	BitCom	9600	2400
	Nicetalk NT 9624vi	$139	ISA half-card	BitFax	BitCom	9600	2400
	Nicetalk NT 9624vm[4]	$169	pocket	BitFax	BitCom	9600	2400
Angia Communications 800/998-0555, 801/288-0488	Fax 24	$289	proprietary[5]	WinFax or QuickLink II	Comit	9600	2400
Archtek America 800/368-5465, 818/912-9800	9624SS-7	$129/$159[3]	ISA half-card/desktop[3]	ArchFax	Comit	9600	2400
	9624PSS-7	$199	pocket	ArchFax	Comit	9600	2400
	9614BAV	$295	ISA ⅔-card	ArchFax	Comit	14,400	14,400
ATI Technologies 416/756-0718 ext. 491	2400 ETC Fax	$149	ISA ¾-card	FaxETC	none	9600	2400
AT&T Paradyne 800/482-3333, 813/530-2000	AT&T DataPort 9.6/Fax	$299	ISA half-card	QuickLink II	QuickLink II	9600	9600
Bay Connection 408/270-8070	Spectra-Com FM9642	$149/$169[3]	ISA half-card/desktop[3]	ComitFax for Windows	Comit	9600	2400
	Spectra-Com FM1496P	$299	pocket	ComitFax for Windows	Comit	9600	14,400
Best Data Products 800/632-2378	Smart One 9624F	$129	ISA half-card	QuickLink II	QuickLink II	9600	2400
	Smart One 9624FX	$159	desktop	WinFax Pro	Comit	9600	2400
	Smart One 2442F	$179	ISA full-card	WinFax Pro	Comit	9600	2400
Boca Research 407/997-6227	FM9624	$165/$195[3]	ISA half-card/desktop[3]	Mirrorfax	Mirrorfax	9600/4800[7]	2400
Cardinal Technologies 800/233-0187	MB2296SR	$129	ISA half-card	QuickLink II	QuickLink II	9600	2400
	MVP96IF	$249	ISA half-card	QuickLink II	QuickLink II	9600	9600
Choice Technology Group Ltd. 619/487-5640	DeskFax Pro-Pak	$239	ISA half-card	DeskFax	DeskFax	9600	2400
CMS Enhancements 714/222-6000	X9648	$119/$139[3]	ISA half-card/pocket[3]	QuickLink II	Combase	9600/4800[7]	2400
The Complete PC 800/229-1753, 408/434-0145	The Complete Modem Plus	$149	ISA half-card	Rapidfax	BitCom	9600/4800[7]	2400
Computer Friends 800/547-3303, 503/626-2291	Dynalink 9624P	$129	pocket	BitFax	BitCom	9600	2400
Computer Peripherals 800/854-7600, 805/499-5751	Viva 2442	$199/$229[3]	ISA half-card/pocket[3]	QuickLink II	QuickLink II	9600	9600
	Viva Data/Fax	$99/$129[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600/4800[7]	2400
	Viva 2496ef	$159	desktop	QuickLink II	QuickLink II	9600	2400
	Viva 2496 Pocket	$189	pocket	QuickLink II	QuickLink II	9600	2400
Data Race 210/558-1900	RediCard 2496	$299	PCMCIA 2.0	BitFax	none	9600	2400
DFI 916/568-1234	FaxModem-300	$149	ISA half-card	BitFax	BitCom	9600/4800[7]	2400

[1] AL = AppleLink
AOL = America Online
CS = CompuServe
GE = GEnie
P = Prodigy
[2] $39 option.
[3] Internal/external models.
[4] Choice of built-in serial cable or inboard serial connector.
[5] For Toshiba portables with "D" dedicated slot.
[6] In software.

FAX PROTOCOLS			ERROR CONTROL			DATA COMPRESSION			OTHER		SERVICE AND SUPPORT			
Class I	Class II	CAS	V.42	MNP 4	MNP 10	MNP 5 (2:1)	MNP 7 (3:1)	V.42bis (4:1)	Power switch	Dual jacks	Warranty (years)	Daily support hours	On-line service[1]	Reader service number
●	●	○	●	●	○	●	○	●	n/a	●	5	8	AOL	720
●	○	○	●	●	○	●	○	●	n/a	●	5	8		720
●	●	○	●	●	○	●	○	●	●	●	5	8		720
●	●	○	●	●	○[2]	●	○	●	●	○	5	8		720
●	●	●	●	●	○	●	○	○	●	●	1	9	none	721
●	●	○	●	●	○	●	○	●	●	●	5	9	none	722
●	●	○	●	●	●	●	○	●	n/a	●	5	9		722/722
●	●	○	●	●	●	●	○	●	n/a	●	5	9		722
●	●	○	●	●	●	●	○	●	n/a	●	5	9		722/722
●	●	○	●	●	○	●	○	●	n/a	●	2	9	none	723
●	●	○	●	●	○	●	○	●	●	○	2	9		723
●	●	○	●	●	○	●	○	●	n/a	●	2	9		723
●	●	○	○	○	○	○	○	○	n/a	●	5	8.5	none	724/724
●	●	○	○	○	○	○	○	○	n/a	○	5	8.5		724
●	●	○	●	●	○	●	○	●	n/a	○	5	8.5		724
○	●	○	●	●	○	●	○	●	n/a	●	2	9	none	725
○	●	○	○	○	○	○	○	○	●	●	2	9		725
○	●	○	●	●	○	●	○	●	n/a	●	2	9		725
○	●	○	●	●	○	●	○	●	●	●	2	9		725
○	●	○	○	○	●	○	○	○	n/a	○	lifetime	11	CS	726
○	●	○	○	●[6]	○	●[6]	●[6]	○	n/a	●	2	8	none	727/727
○	●	○	○	●[6]	○	●[6]	●[6]	○	●	○	2	8		727
●	○	○	●	●	○	●	○	●	n/a	●	2	8		727
●	○	○	●	●	○	●	○	●	n/a	●	5	10	CS	728
●	○	○	●	●	○	●	○	●	n/a	●	lifetime	12	AT&T Mail, CS	729
○	●	●	●	●	○	●	●[6]	●	n/a	●	5	8	AL, AOL	730/730
○	●	○	●	●	○	●	●[6]	●	●	●	5	8		730
○	●	○	○	○	○	○	○	○	n/a	●	2	8.5	P	731
○	●	○	○	○	○	○	○	○	○	●	2	8.5		731
●	●	○	●	●	○	●	○	●	n/a	●	2	8.5		731
●	○	○	○	○	○	○	○	○	n/a	●	5	11	CS, GE	732/732
○	●	○	○	○	○	○	○	○	n/a	●	lifetime	9	none	733
○	●	○	●	●	○	●	○	●	n/a	●	lifetime	9		733
●	●	●	●[6]	●[6]	○	●[6]	○	●[6]	n/a	●	1	9	none	734
●	○	○	○	○	○	○	○	○	n/a	○	1	10	none	735
●	○	○	●[6]	●[6]	○	○	○	●[6]	n/a	●	7	10	CS	736/736
○	●	○	○	○	○	○	○	○	●	●	1	8	CS	737
○	●	○	●	●	○	●	○	●	n/a	●	5	10	CS	738/738
●	○	○	●[6]	●[6]	○	●[6]	○	●[6]	n/a	●	5	10		738/738
●	○	○	●	●	○	●	○	●	●	●	5	10		738
○	●	○	○	○	○	○	○	○	●	●	5	10		738
●	○	○	●	●	○	●	○	●	○	●	5	10	CS	739
○	●	○	○	○	○	●	○	○	n/a	●	1	9	none	740

[7] 9600 send/4800 receive.

Table continues on following pages

Fax-Modems (continued)

● = Yes ○ = No
n/a = not applicable

Company	Product	List price	Form	SOFTWARE Fax	SOFTWARE Data	SPEED Fax	SPEED Data
Dove Computer 800/849-3297, 919/343-5600	Dovefax LE	$229	desktop	Eclipse	none	9600/4800[2]	2400
E-Tech Research 408/730-1388	UFOmate P9624MX	$165	pocket	QuickLink II	QuickLink II	9600	2400
Everex Systems 800/821-0806, 510/498-1111	Everfax 24/96	$169/$249[3]	ISA full-card/desktop[3]	EFAX4/Fax Maker	none	9600	2400
Extech Data Systems 617/890-7440	Model 765096	$299	pocket	MTEZ w/Express Fax	BitCom	9600	9600
Fax Pro 800/346-1799	Fax Pro IIC	$299	ISA half-card	ColorFax[4]	Faxpro for Com	14,400	14,400
Forval America 801/561-8080	Forval 2496	$219/$277[3]	ISA half-card/desktop[3]	QuickLink II	none	9600	2400
GVC Technologies 800/289-4821, 201/579-3630	FM9696/24V	$169/$185[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600	2400
	FM9696/24	$131/$145[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600	2400
	FMM9696/24V	$199	pocket	QuickLink II	QuickLink II	9600	2400
	FMM9696/24	$179	pocket	QuickLink II	QuickLink II	9600	2400
Intel 800/538-3373, 503/629-7354	SatisFaxtion Modem/100	$129	ISA half-card	Faxability Plus	Crosstalk	9600/4800[2]	2400
Logicode Technology 800/735-6442, 805/388-9000	Logicode 9624V	$134/$169[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600	2400
Maxtron 818/350-5706	9696i	$275	ISA half-card	BitFax	BitCom	9600	9600
	1414i	$295	ISA half-card	BitFax	BitCom	14,400	14,400
Megahertz 800/527-8677, 801/272-6000	P224FMV	$249	pocket	Eclipse Fax	MTEZ	9600	2400
	T324FM	$299	proprietary[5]	WinFax Lite	MTEZ	9600	2400
Mitsuba 800/648-7822, 909/392-2000	SM Fax96	$85	ISA half-card	QuickLink II	QuickLink II	9600/4800[2]	2400
Omron Office Automation Products 408/727-1444	Omron Impala 24/96	$299	pocket	WinFax Lite	BitCom	9600	2400
PC Logic 717/399-2399	Fax24I	$98[6]	ISA half-card	QuickLink II	QuickLink II	9600	2400
Perfect Data 805/581-4000	Easymodem 24 Plus	$269/$299[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600	2400
Practical Peripherals 800/442-4774, 805/497-4774	PM9600FX	$299	ISA half-card	QuickLink II	QuickLink II	9600	9600
	PM2400EFX	$189/$199[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600	2400
	PM2400FX96	$139/$149[3]	ISA half-card/desktop[3]	QuickLink II	QuickLink II	9600	2400
QuickComm Technologies 800/551-6166, 408/956-8236	Spirit II	$229/$249[3]	ISA half-card/desktop[3]	WinFax/DosFax Lite	Qmodem	9600	14,400
Supra 800/727-8667, 503/967-2400	SupraFaxModem V.32[7]	$300	desktop	FaxTalk or WinFax Lite	Comit	9600	9600
	SupraFaxModem Plus	$170	desktop	FaxTalk or WinFax Lite	Comit	9600	2400
Swan Technologies 800/468-9044, 814/234-2236	Swan 9600 S/R	$99	ISA half-card	QuickLink II	QuickLink II	9600/4800[2]	2400
Telenetics 714/455-4000	2496f	$129	ISA half-card	FacsExpress	Dataxpress	9600	2400
	Hide Away Fax	$199	pocket	FacsExpress	Dataxpress	9600	2400
TwinCom 800/666-2496, 201/935-8880	TwinCom 24/96	$149	ISA half-card	QuickLink II	QuickLink II	9600	2400
	TwinCom 14.4/DFI	$299	ISA ¾-card	QuickLink II	QuickLink II	14,400	14,400
U.S. Robotics 800/342-5877, 708/982-5001	Sportster 14,400 Fax	$259/$299[3]	ISA half-card/desktop[3]	BlastFax PC	Crosstalk[9]	14,400	14,400
	Sportster 9600 Fax	$239/$249[3]	ISA half-card/desktop[3]	BlastFax PC	Crosstalk[9]	9600	9600
	Sportster 2400 Fax	$159/$169[3]	ISA half-card/desktop[3]	BlastFax PC	Crosstalk[9]	9600	2400
Zoltrix 510/657-1188	Zoltrix 144/144e	$249/$299[3]	ISA ¾-card/desktop[3]	BitFax	BitCom	14,400	14,400
	Zoltrix Enhanced	$149	ISA half-card	BitFax	BitCom	9600	2400
	Zoltrix Standard/Windows	$129	ISA half-card	BitFax	BitCom	9600	2400
	Zoltrix Pocket 96/24	$169	pocket	BitFax	BitCom	9600	2400
Zoom Telephonics 800/631-3116, 617/423-1072	FCV+[7]	$169	ISA half-card	MTEZ w/Express Fax	MTEZ	9600	2400
	AFC Internal/AFX	$79/$99[3]	ISA half-card/desktop[3]	MTEZ w/Express Fax	MTEZ	9600	2400
	FaxModem VFP V.32bis	$299	ISA ¾-card	MTEZ w/Express Fax	MTEZ	14,400	14,400

[1] AL = AppleLink, AOL = America Online, CS = CompuServe, GE = GEnie, P = Prodigy
[2] 9600 send/4800 receive.
[3] Internal/external models.
[4] Can send color faxes with ColorFax at both ends of connection.
[5] For Toshiba portables with "D" dedicated slot.
[6] $108 with QuickLink II for Windows.

FAX PROTOCOLS			ERROR CONTROL			DATA COMPRESSION			OTHER		SERVICE AND SUPPORT			
Class I	Class II	CAS	V.42	MNP 4	MNP 10	MNP 5 (2:1)	MNP 7 (3:1)	V.42bis (4:1)	Power switch	Dual jacks	Warranty (years)	Daily support hours	On-line service[7]	Reader service number
●	○	○	○	○	○	○	○	○	○	●	1	9	AOL, AL, CS	741
●	●	○	●	●	○	●	○	●	●	●	2	10	none	742
○	●	●	●	●	○	●	○	●	n/a	●	2	9	AOL, CS	743/743
○	●	○	●	●	○	●	○	●	○	●	2	9.5	CS	744
●	●	○	●	●	○	●	○	●	n/a	●	3	8	none	745
○	●	●	●	●	○	●	○	●	n/a	●	5	9	none	746/746
○	●	○	●	●	○	●	○	●	n/a	○	5	8	CS, GE	747/747
○	●	○	○	○	○	○	○	○	●	●	5	8		747/747
○	●	○	●	●	○	●	○	●	●	●	5	8		747
○	●	○	○	○	○	○	○	○	●	●	5	8		747
●	○	●	○	○	○	○	○	○	n/a	●	3	10	CS, MCI	748
●	●	○	●	●	○	●	○	●	○	●	lifetime	9	none	749/749
○	●	○	●	●	○	●	○	●	n/a	●	2	9.5	none	750
○	●	○	●	●	○	●	○	●	n/a	●	2	9.5		750
○	●	●	●	●	○	●	○	●	○	○	5	11	CS	751
○	●	●	●	●	○	●	○	●	n/a	○	5	11		751
●	●	○	○	○	○	○	○	○	n/a	●	15 months	9	none	752
○	●	○	●	●	○	●	○	●	●	●	2	8	CS	753
○	●	○	○	○	○	○	○	○	n/a	●	3	9	none	754
●	○	○	●	●	○	●	○	●	n/a	●	3	7.5	none	755/755
●	●	○	●	●	○	●	○	●	n/a	○	lifetime	14	AOL, CS,	756
●	●	○	●	●	●	●	○	●	n/a	○	lifetime	14	GE, P	756/756
○	●	○	○	○	○	○	○	○	n/a	○	lifetime	14		756/756
●	○	○	●	●	○	●	○	●	n/a	●	lifetime	9	none	757/757
●	●	○	●	●	○	●	○	●	●	●	5	9	AL, AOL, BIX,	758
●	●	○	●	●	●	●	○	●	●	●	5	9	CS, GE	758
○	●	○	●	●	○	●	○	●	n/a	●	2	12	none	759
○	●	○	○	○	○	●	○	○	○	●	5	9	none	760
○	●	○	●	●	○	●[8]	○	●	●	○	5	9		760
○	●	○	○	○	○	○	○	○	n/a	●	1	9.5	none	761
●	●	○	●	●	○	●	○	●	n/a	●	2	9.5		761
●	○	○	●	●	○	●	○	●	n/a	●	5	10.5	CS	762/762
●	○	○	●	●	○	●	○	●	n/a	●	5	10.5		762/762
●	○	○	●	●	○	●	○	●	n/a	●	5	10.5		762/762
●	●	○	●	●	○	●	○	●	n/a	●	5[10]	9	none	763/763
○	●	○	●	●	○	●	○	○	n/a	●	5[10]	9		763
○	●	○	○	●[8]	○	●[8]	○	○	n/a	●	5[10]	9		763
○	●	○	○	○	○	○	○	○	●	●	5[10]	9		763
●	●	●[8]	●	●	○	●	○	●	n/a	●	7	8	AOL, CS,	764
●	○	●[8]	●	●	○	●	○	●	n/a	●	7	8	GE	764/764
●	●	●[8]	●	●	○	●	○	●	n/a	●	7	8		764

[7] Displays caller's phone number on PC with Caller ID.
[8] In software.
[9] External modem does not include data software.
[10] Five years on labor, one year on parts.

For more information about all products in this table, circle reader service no. 901.

- Add more storage.
- Protect your data.
- Transport your data.
- Share your data.

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150 Megabyte Disk For Bernoulli MultiDisk Drives

IOMEGA 21 MB FLOPTICAL DISKETTE

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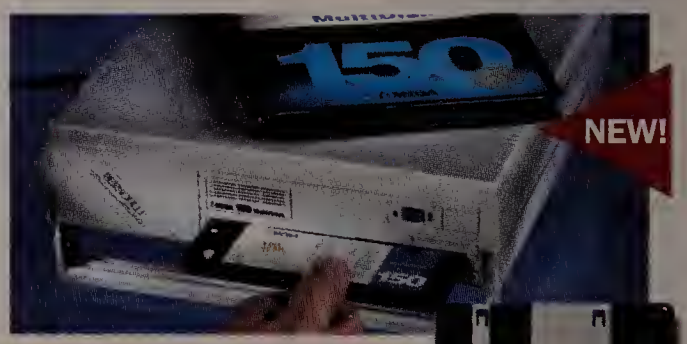

Bernoulli® MultiDisk™ 150. Handles like a floppy, performs like a hard disk.

- 150MB capacity.
- 18-msec effective access time.
- Rugged Bernoulli Technology.®
- Disks also available in 105, 65, and 35MB capacities.
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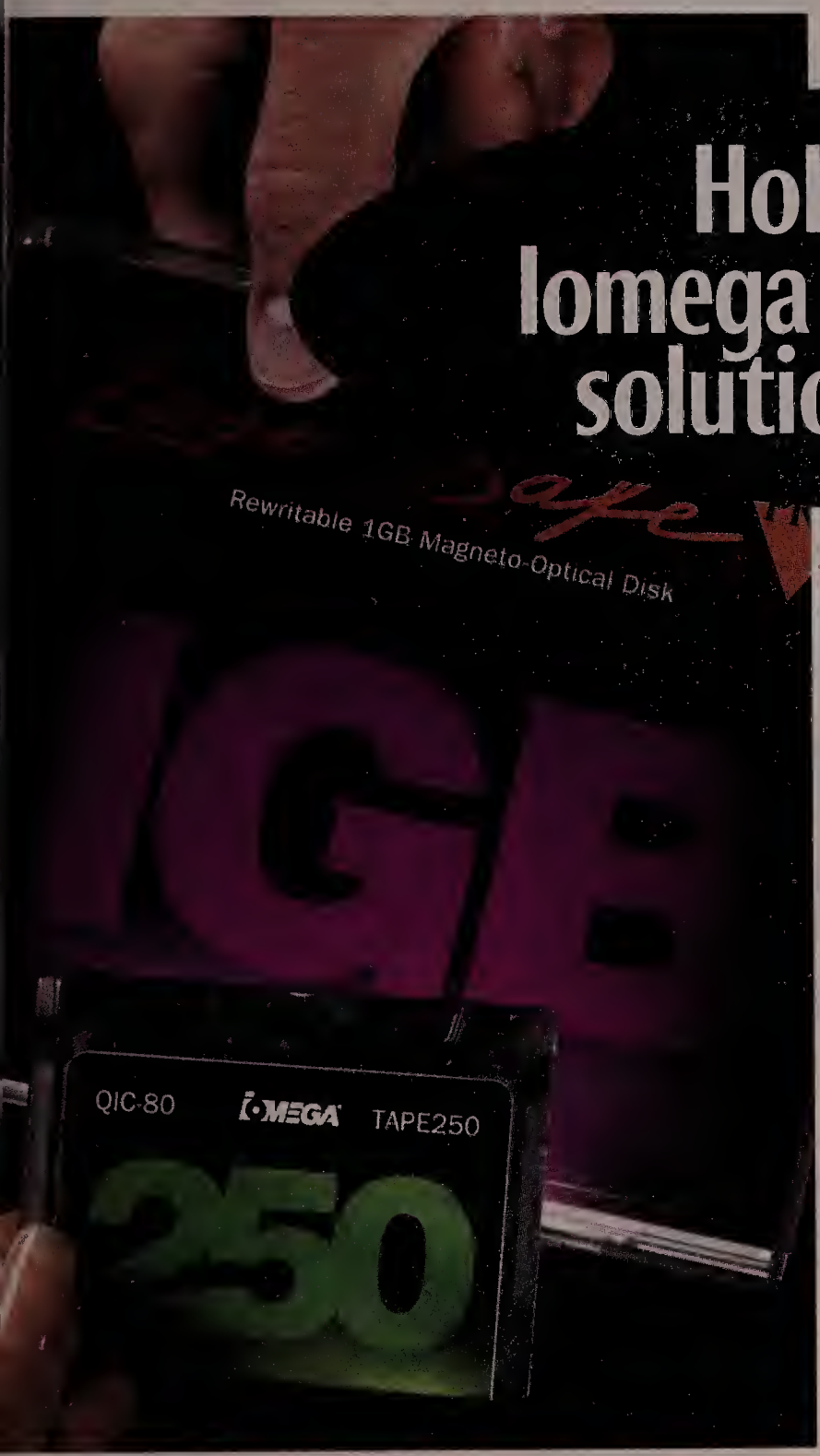
call 1-800-456-5522. In Europe, call 49-761-45040. For worldwide customer



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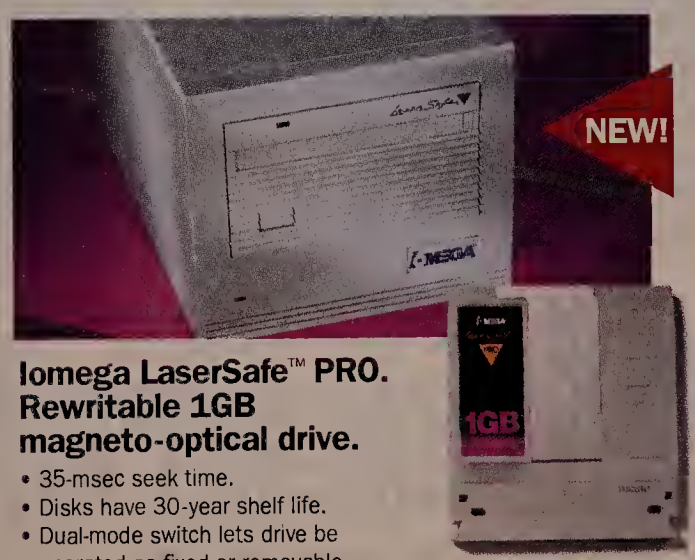

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- ISO compatible, so it reads & writes to 650MB MO disks.

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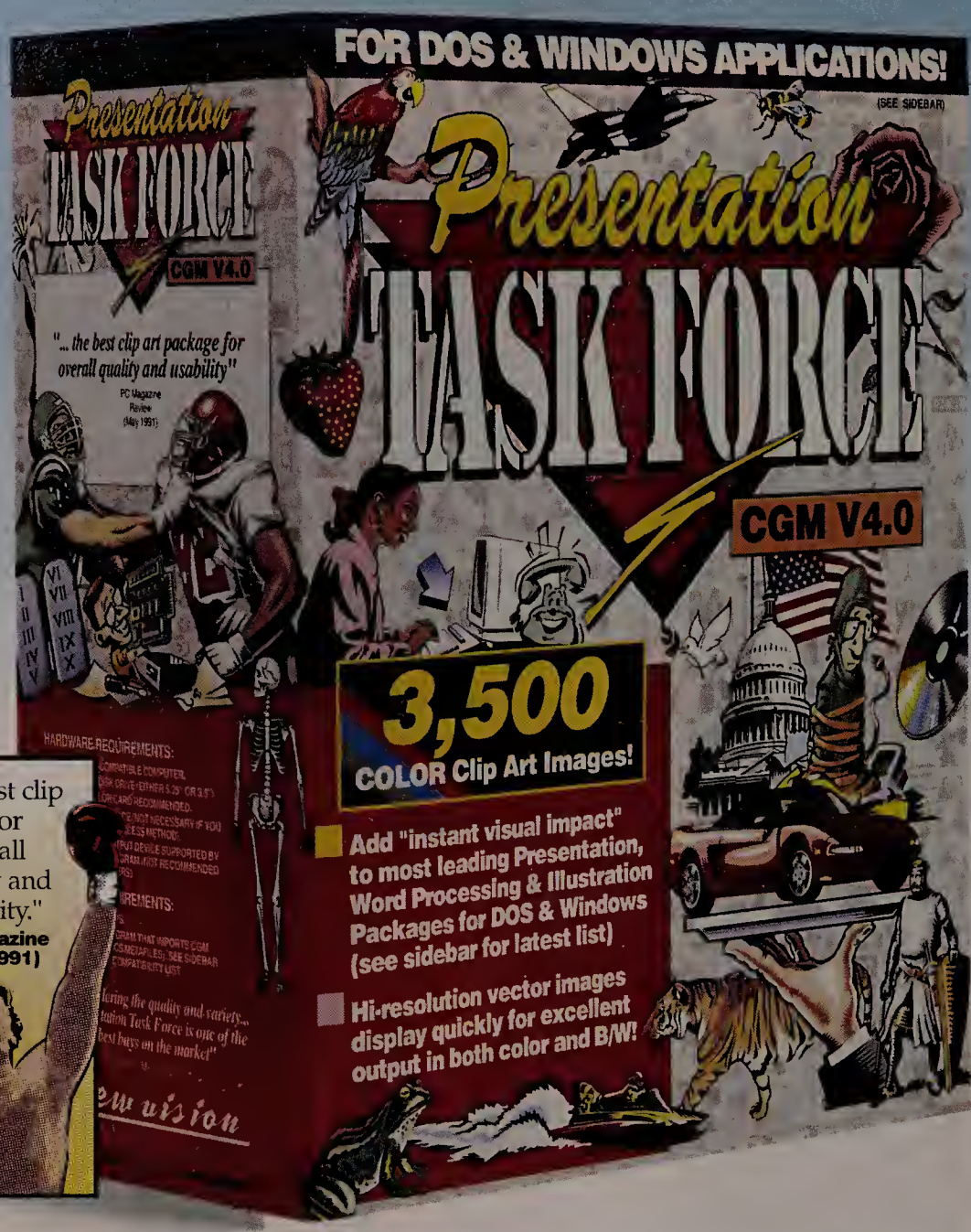
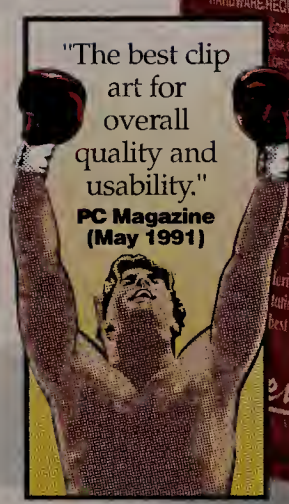
Circle 152 on reader service card





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PC Computing (May 1992)

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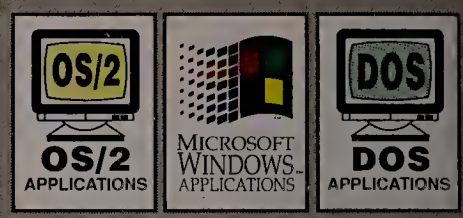
Circle 177 on reader service card

Presentation TASK FORCE

WORKS WITH:



- ALDUS FREEHAND
- AMI PROFESSIONAL
- APPLAUSE II
- CHARISMA
- CORELDRAW!
- DESIGNER
- DRAWPERFECT
- EXPRESS PRESENTER
- EXPRESS PUBLISHER
- FREELANCE GRAPHICS
- FREELANCE GRAPHICS FOR WINDOWS
- HARVARD DRAW
- HARVARD GRAPHICS 3.0
- HARVARD GRAPHICS FOR WINDOWS
- HIJAAK
- HIJAAK FOR WINDOWS
- HOLLYWOOD
- LOTUS 1-2-3
- MICROSOFT EXCEL 4.0
- MICROSOFT PUBLISHER
- MICROSOFT WORD FOR WINDOWS
- MULTIMATE
- PAGEMAKER FOR WINDOWS
- PERSUASION FOR WINDOWS
- POWERPOINT FOR WINDOWS
- PRESENTATION EXPRESS
- PRESENTATION TEAM
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- QUATTRO PRO
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DRAW Programs for the Rest of Us

Need quick and easy graphics to dress up your reports and presentations? Our roundup picks the best low-cost Windows draw programs for business users.

DAVID FLAHERTY

Adding a flow chart to a business proposal or a logo to a report can make a difference by selling your ideas and making a good impression. The fact is, drawings, clip art, logos, maps, and diagrams aren't just pretty pictures, but extra touches that help you persuade, pitch, and polish.

To help you add graphics to your work easily, we evaluated the new crop of seven *Windows* draw programs aimed at those of us who didn't graduate from art school. These entry-level packages cost under $300 and are ideally suited to busy managers who have never used a draw program and need to create graphics with minimal fuss. In addition to standard drawing and text-handling features, most of these programs come bundled with extra fonts and a collection of clip

By Richard Jantz

The High-Priced Brand

If you're serious about creating professional graphics, you might want to invest in a high-end *Windows* draw package such as Corel Systems' *CorelDraw* or *Micrografx Designer*. These provide state-of-the-art drawing features and come bundled with better graphics tools, including more fonts and clip art, than their low-end relatives. For example, *CorelDraw 3.0* comes with 256 fonts and 12,000 clip art images, and it includes charting, bit-mapped painting, auto-tracing, and presentation graphics modules—making it a virtual one-stop graphics solution.

The trade-off in using a high-end draw program's sophisticated features and bundled bonuses is a higher price and a steeper learning curve. For example, *Adobe Illustrator 4.0*, *Designer 3.1*, and Computer Support Corporation's *Arts & Letters Graphics Editor 3.12* all cost $695, Aldus Corporation's *Aldus Freehand 3.11* and *CorelDraw 3.0* are $595, and Gold Disk's *Professional Draw 1.1* is $495. In addition, high-end draw packages are aimed at graphics professionals, not novices. Learning to use their powerful and versatile drawing and object manipulation features is more difficult than learning to use the smaller tool palettes provided by the low-end draw programs.

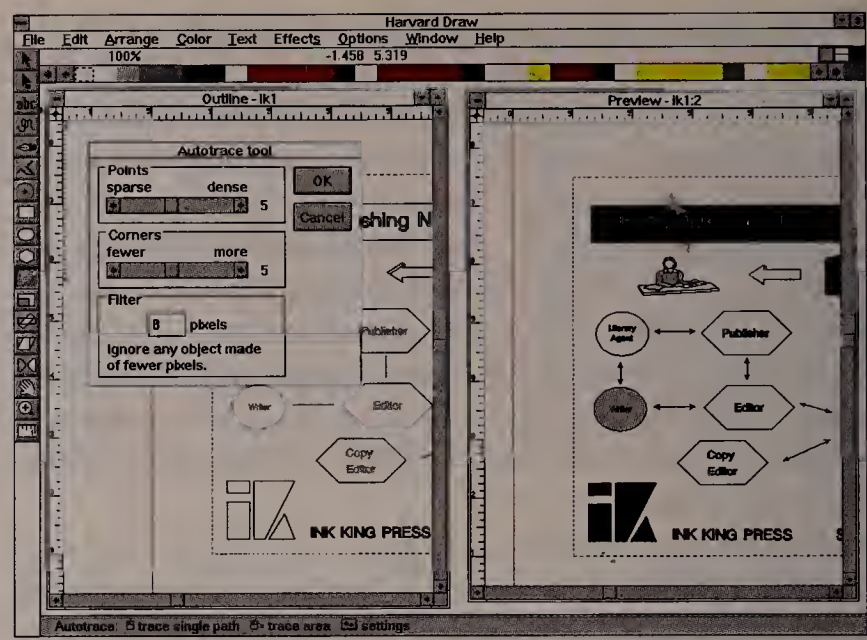
For maximum precision, 3-D object rotation, and other niceties, you'll need one of the high-end draw packages.

In Living Color

The key feature that characterizes high-end draw packages is their advanced color capabilities. These include the capability to generate color separations for full-color printing jobs, color trapping controls to ensure proper alignment of overlapping colors, and multicolored gradient fills for rainbow effects. High-end draw packages such as *CorelDraw* also sport more features for precision work; repetitive drawing aids, such as duplicating one shape many times around a pivotal point; more curve editing tools; and 3-D object rotation, including light source direction control. All this makes them more equipped for realistic pictorial representations, such as architectural renderings, technical diagrams, and other complex illustrations.

Most high-end draw packages also offer more special effects than low-end packages, such as placing blended objects along an editable path, importing an image and using it as a fill pattern, applying any fill inside text characters, and fitting text within shapes and around objects. Special effects like these increase the many ways in which you can enhance virtually any artwork.

Still, you don't have to learn how to use all the features just to add a few improvements to your business drawings. Considering the extra fonts and clip art you get with them, as well as the more sophisticated features, you may find that a high-end package is the best investment for your present and future graphics needs.



HARVARD DRAW FOR WINDOWS' AUTOTRACE made it easy to convert a scanned version of the Ink King logo into an editable draw object.

Harvard Draw 1.01 for Windows

PROS: First-rate drawing tools, abundant fonts and clip art
CONS: Complicated interface for inexperienced users, can't open multiple files

Harvard Draw for Windows features extensive drawing and manipulation features and a truckload of fonts and clip art. Its auto-trace capability, which converts scanned graphics (such as a business logo) into editable objects, is terrific. And the program is a good bargain: Although its sophisticated draw tools are more on a par with graphics powerhouses such as *CorelDraw*, at $249 *Harvard Draw* costs less than *IntelliDraw* or *Visio* and only $100 more than *Windows Draw* does.

But be forewarned: *Harvard Draw* is no entry-level package. Although it was certainly capable of producing our test documents, we had to refer to the manual often and climb a substantial learning curve. Goodwin, our tester, recognized the program's power, but felt it suffered from "an overly complicated interface, where features are buried in multiple layers of menus and dialog boxes."

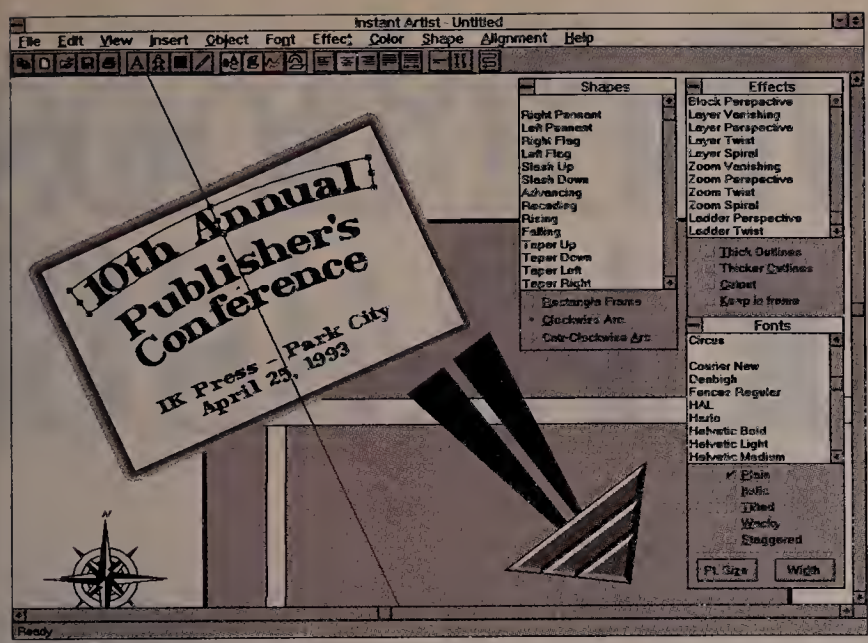
In short, *Harvard Draw* is a professional draw program at an entry-level price, so it's a better choice for technical illustrators and other experienced graphics users than for busy managers who need to produce only an occasional business illustration. But if you have the time to master its powerful tools, *Harvard Draw* is capable of delivering the highest-quality graphics in this roundup.

Harvard Draw for Windows, Software Publishing; 408/988-7518.
Reader service no. 785.

Instant Artist 1.0 for Windows

PROS: Provides ready-made drawings, text perspective effects
CONS: Meager drawing tools, inefficient text editing, limited import/export filters

Instant Artist from Autodesk is designed to serve novice graphics users with modest needs. The program's biggest attraction is a variety of ready-made signs, banners, letterheads, envelopes, greeting cards, and business cards that are suitable for small-business owners and entrepreneurs. But as soon as we left these behind and tried to produce our test drawings, we were on an uphill climb.



INSTANT ARTIST PROVIDES SHAPES and effects easily applied to text. The Clockwise Arc shape was selected for the "10th Annual" text.

Like Apprentice, Instant Artist makes you use a separate dialog box for entering text, and provides predrawn symbols instead of standard point-and-click tools. Unfortunately, Instant Artist is also the only program here lacking freehand tools and object control points; it left us hamstrung when we tried to draw trapezoids and free-form objects. Even custom arrows weren't easy to produce.

On the plus side, *Instant Artist* performs a number of eye-catching tricks, including fitting text on a path and text perspective effects. But unless you're very enthusiastic about *Instant Artist*'s predesigned drawings, you'll probably want a more versatile and easy-to-use draw program.

Instant Artist for Windows, Autodesk Retail Products; 800/228-3601, 206/487-2233.

Reader service no. 786.

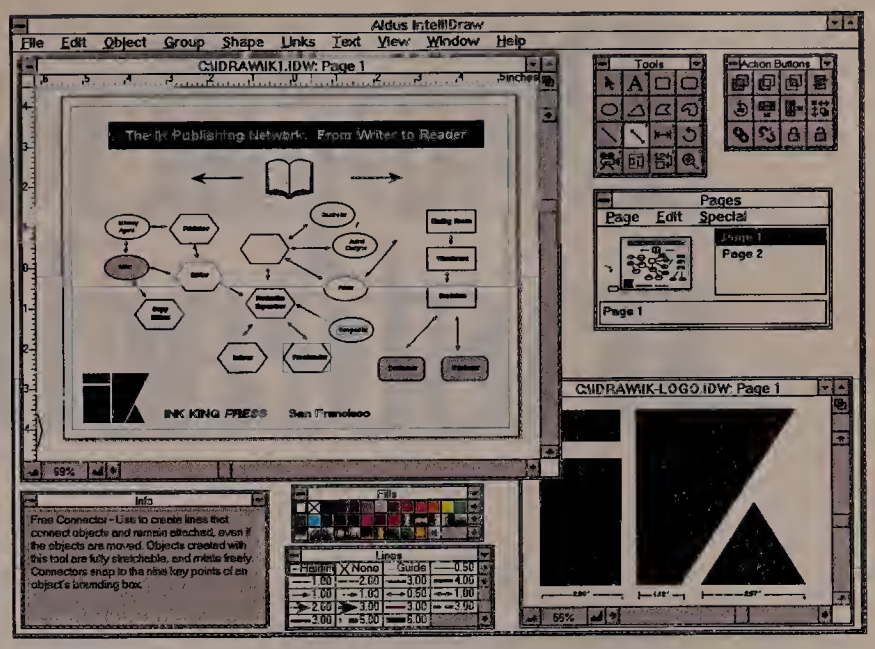
IntelliDraw 1.0

PROS: Strong drawing and manipulation tools, advanced automated features
CONS: No bundled fonts, limited text handling

IntelliDraw and *Visio* really belong in a league of their own. Neither program is as well-suited as *Windows Draw* for projects that require fancy text effects and a wide variety of clip art. But with their automated features, both are excellent choices for producing structured drawings such as our test illustrations.

IntelliDraw distinguishes itself from *Visio* with more powerful and plentiful drawing and manipulation features. One example is the unique Symmetrigon tool, which lets you draw half an object while the tool symmetrically completes the other half. On the other hand, *IntelliDraw* isn't quite as easy to learn as *Visio*. You can select *IntelliDraw*'s short menus option to hide the program's more advanced features, but its numerous tools and floating palettes can confuse drawing neophytes.

Goodwin found *IntelliDraw*'s automated features ideal for creating and positioning the elements in the test flow chart. *IntelliDraw* surpasses all other packages in alignment by enabling you to align objects diagonally, and to space objects an equal distance apart. Better yet are *IntelliDraw*'s automated features (shared by *Visio*) for attaching text to an object, connecting objects, and using master



INTELLIDRAW FEATURES FLOATING PALETTES full of automated drawing tools, but graphics neophytes may find it intimidating.

shapes to make global changes to an entire drawing.

If you need to produce precision drawings, *IntelliDraw* is a godsend. Be prepared, however, to buy additional fonts and clip art—and to set time aside to learn this powerful, feature-rich program.

IntelliDraw, Aldus; 206/628-2320, 206/343-4216 (fax).

Reader service no. 787.

KEYDRAW PLUS FOR WINDOWS rarely gives you a preview of curved text that accurately represents what will print.

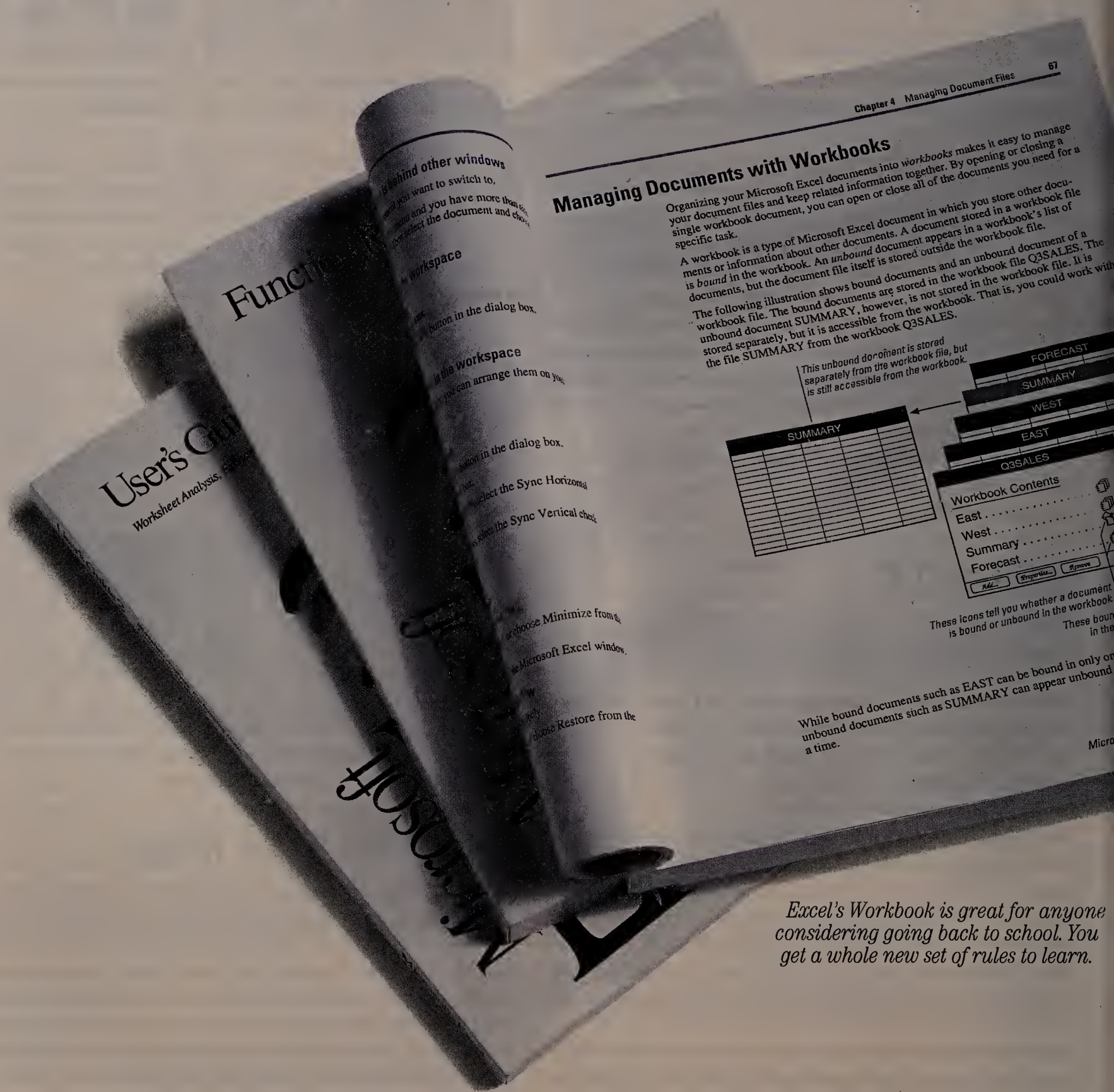
KeyDraw Plus 3.0 for Windows

PROS: Good drawing tools, text perspective effects, plentiful fonts
CONS: Cumbersome text editing, unimpressive clip art, can't lock objects

KeyDraw Plus for Windows, the lowest-priced package in our roundup, combines solid drawing tools with mid-range charting features for bar graphs, pie charts, and the like. But if your graphics involve much text, using *KeyDraw Plus* can be a frustrating experience. Our tester summed up the program's text-handling capabilities in two words: "tremendously unintuitive."

Although you can type text directly on drawings, *KeyDraw Plus* doesn't support word wrap—or even carriage returns. After you've carefully positioned lines of text, it's difficult to edit or resize them,

People who choos
instead of 1-2-3's 3-



Excel's Workbook is great for anyone considering going back to school. You get a whole new set of rules to learn.

*In Canada, call **1-800-GO-LOTUS.** ©1993. Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus and 1-2-3

e Excel's Workbook D have a lot to learn.

The first thing they'll have to learn is an extensive set of new commands and procedures.

Because unlike 1-2-3's 3-D, which lets ou work just like you do in 1-2-3's 2-D, Excel's Vorkbook has a whole new set of rules.

The second thing they'll learn is that Iicrosoft® Excel doesn't really have 3-D rchitecture. Instead, it takes separate 2-D vorksheets, each saved separately in its own le, links them and stores them together in vhat they call a Workbook.

1-2-3's true 3-D architecture, on the other hand, actually lets you work multiple worksheets, tightly integrated, in one file. Because they are in one file, it's easy to create formulas, graphs and formatted reports that actually function across individual worksheets.

2-D can look like 3-D, but...

It doesn't take long to learn what ou're giving up.

Because Excel's 2-D worksheets are each in their own file, it's more difficult to vork with them together.

So while 1-2-3's GROUP mode stays in effect as you move from sheet to sheet, Excel's shuts off every time you move to another sheet.

While 1-2-3® users can assign range names and formulas across 3-D ranges, Excel users can't.

While 1-2-3 users can graph 3-D data in one step, Excel users can't.

While 1-2-3 users can create 3-way what-if tables, Excel users are limited to 2-way tables.

And while 1-2-3 is fully compatible with 1-2-3 for DOS 3-D files, Excel is not.

Compared to true 3-D, Excel's Workbook process is invariably more complex, less intuitive, more work intensive, and because everything is done through data links, slower.

In fact, it can take Excel 10 times longer than 1-2-3 to recalculate a multisheet file.

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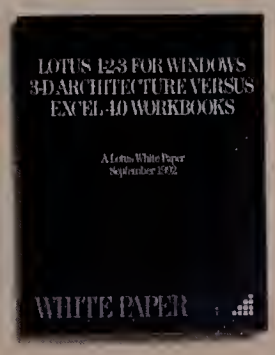

Lotus® 1-2-3 Release 1.1
Spreadsheet for Windows

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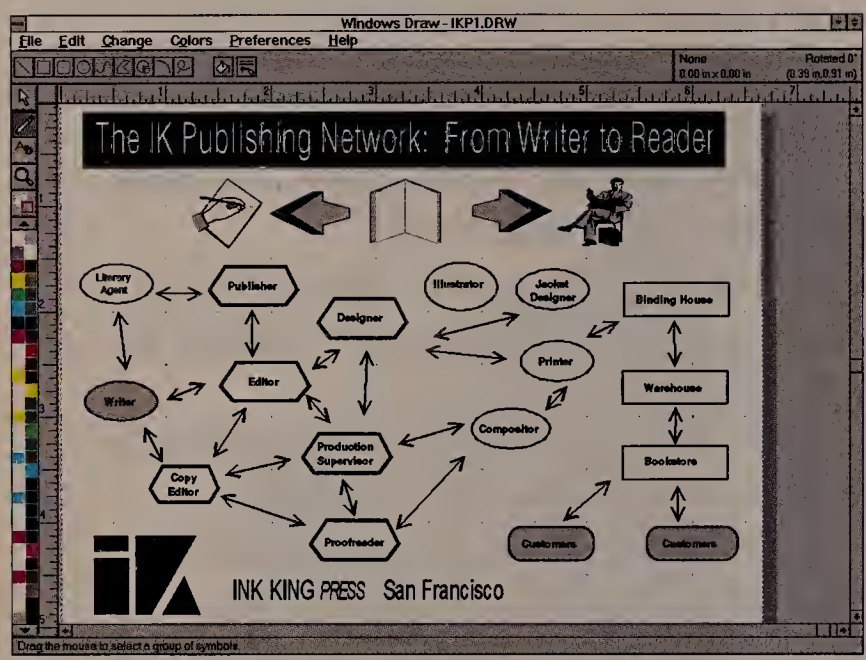
or to link text blocks to other objects. *KeyDraw Plus* simply doesn't handle text with the ease you'd expect from a *Windows* program.

KeyDraw Plus is a perfectly acceptable drawing tool; it was fine for creating the logo and for manipulating objects in the test drawings. It also packs fancy drawing features for creating distortion and text perspective effects similar to those in high-end draw packages. Far less impressive, however, was *KeyDraw Plus*'s clip art, which was not as polished or businesslike as other collections.

KeyDraw Plus fills the bill for budget-conscious novices, but most users should spend more for a draw partner that handles text better.

KeyDraw Plus for Windows, SoftKey Software Products, Inc.; 800/377-6567, 407/367-0005, 407/367-1611 (fax).

Reader service no. 788.



BEST BUY WINDOWS DRAW 3.0 PLUS OLE has one of the best clip art selections, as well as plenty of useful fonts.

Windows Draw 3.0 Plus OLE

PROS: Intuitive interface, excellent drawing tools, plentiful fonts and clip art
CONS: Can't open multiple files, can't adjust kerning

Windows Draw's impressive combination of powerful drawing tools and excellent ease of use earns it our Best Buy award. The package handled our test documents with aplomb, proving to be the best choice for the average business user who wants to produce quality graphics without breaking a sweat. Goodwin was hooked almost immediately.

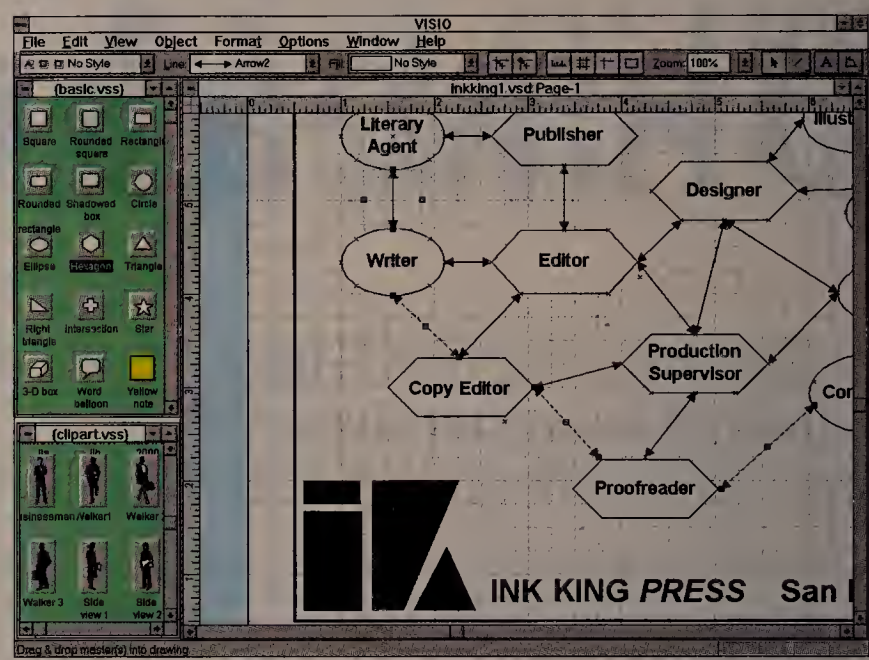
Windows Draw includes all the standard tools entry-level users need, plus such extras as control point editing, gradient fills, fitting text on a path, object blending, and more. It comes with plenty of quality fonts (both TrueType and Adobe Type 1), and you can edit text easily within drawings. It provides versatile object manipulation features, a generous clip art library, and unbeatable service and support (24 hours, plus limited weekend hours).

Windows Draw is a scaled-down version of its high-end cousin, *Micrografx Designer*, but its interface is much simpler to use. Select drawing, text, zoom, color, or fill icons at the left side of the work area, and the button bar changes to show all the appropriate suboptions. As you drag across icons and menu options, a hint line at the bottom of the screen displays context-sensitive explanations.

Windows Draw doesn't pack all the drawing tricks that *IntelliDraw* and *Visio* provide. But with an interface that won't quit, and a strong array of drawing and text tools, it's still the best all-purpose business graphics tool.

Windows Draw, Micrografx; 214/234-1769, 214-234-2410 (fax).

Reader service no. 789.



WITH VISIO'S STENCILS, you simply select a shape, then drag and drop it into your drawing.

Visio 1.0

PROS: Intuitive interface, easy drag-and-drop drawing tools
CONS: No bundled fonts, limited text handling

Like *IntelliDraw*, *Visio* is best at producing technical diagrams and other no-frills business graphics—particularly those comprised of shapes and interconnected lines or arrows. What sets *Visio* apart is the way it incorporates predrawn symbols into its interface.

Visio comes with a series of stencils that contain common shapes, connectors, and symbols related to specific jobs, such as maps, flow charts and floor plans. With a stencil window open, click the object you want and drag and drop it on your drawing. *Visio*'s clever use of drag-and-drop stencils makes it possible for nonartists to complete a drawing without ever using the standard tools.

Thanks to *Visio*'s stencils, it was even easier to produce most elements of the test drawings than it was with *IntelliDraw*. The program also provides automated tools such as object connection and master shapes to expedite the creation and revision of structured drawings. But *Visio*'s lack of fancier features and its lack of bundled fonts or extensive clip art made it harder to do the pictorial map.

Visio's excellent ease of use makes it the perfect program for managers who need to make a flow chart or marketing diagram in a hurry. But if you also want a package full of clip art and capable of flashy type and more creative graphics, stick with *Windows Draw*.

Visio 1.0, Shapeware Corp.; 206/467-6723, 206/467-7227 (fax).

Reader service no. 790.

For more information about all products in this article, circle reader service no. 902.

Richard Jantz is a contributing editor for PC World *and a publishing and presentations consultant in Berkeley, California.*

Windows Draw Wins Top Drawer

● Yes
○ No

	Arts & Letters Apprentice 1.11	Harvard Draw 1.01 for Windows	Instant Artist 1.0 for Windows	IntelliDraw 1.0	KeyDraw Plus 3.0 for Windows	BEST BUY Windows Draw 3.0 Plus OLE	Visio 1.0
Standard features							
List price	$169	$249	$89.95	$299	$79.95	$149.95	$299
RAM required	2MB	2MB	2MB	4MB	1MB	1MB	4MB
Open/edit multiple files	○	○	○	●	○	○	●
Supports Windows OLE links	○	○	○	●	○	●	●
Variable zoom levels	●	●	●	●	●	●	●
Drawing and text							
Ovals, rectangles, lines, arcs	●	●	●	●	●	●	●
Freehand tools	●	●	○	●	●	●	●
Edit object control points	●	●	○	●	●	●	●
Gradient fills	●	●	○	●	●	●	○
Fonts included	36	60	22	0	36	38	0
Supports TrueType/Type 1 fonts	●/●	●/●	●/●	●/●	○/●	●/●	●/●
Attach text to object automatically	○	○	○	●	○	○	●
Adjust kerning/tracking	●/●	●/●	○/○	○[1]/○	●/○	○/○	○/○
Edit text on drawing	○	●	○	●	●	●	●
Rotate text at any angle	●	●	●	●	●	●	●
Auto-fit text on a path	●	●	●	○	●	●	○
Object manipulation							
Snap-to grid or guidelines	●	●	●	●	●	●	●
Auto-align objects horizontally/vertically	●	●	●	●	●	●	●
Auto-connect objects	○	○	○	●	○	○	●
Copy object attributes	●	●	○	●	●	○	●
Master shapes	○	○	○	●	○	○	●
Rotate/flip objects	●/●	●/●	●/○	●/●	●/●	●/●	●/●
Group/ungroup objects	●	●	●	●	●	●	●
Lock/unlock objects	○	●	●	●	○	●	●
Undo/redo levels	1	16	1	99	1	1	10
Stretch/skew objects	●	●	●	●	●	●	●
Reshape text outlines	●	●	○	●	●	●	○
Auto-blend object shapes	●	●	○	●	●	●	○
Drawing resources							
Imports/exports							
BMP	○/○	●/●	○/●	●/○	○/○	○/○	●/●
PCX	○/○	●/●	○/○	●/●	●/●	●/●	●/●
TIFF	●/●	●/●	○/●	●/●	●/●	●/●	●/●
CGM	○/●	●/●	○/○	●/○	●/●	●/●	●/●
EPS	○/●	●/●	○/●	●/●	○/●	●/●	○/○
WMF	●/●	●/●	●/●	●/●	○/●	●/●	●/●
Clip art images/symbols	3500	1650	700	300	500	2600	300
Preview clip art/symbols	○	●	●	●	●	●	●[2]
Service and support							
Context-sensitive help	●	●	○	●	○	●	●
Free support	●	●	●	●[3]	●	●	●[3]
Toll-free support line	○	○	○	○	○	○	○
Weekday support hours	10	9	10	10	11	24[4]	12
BBS	●	●	○	●	○	●	●

[1] Automatic pair kerning only. [2] Limited to symbols in stencil. [3] Free for 90 days. [4] Weekend support 9 hours per day.

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DRAWING										
Supports TrueType & Type 1 fonts	●	●	●	●	●			●	●	Industry standard font formats
Interactive on screen kerning	●						●			Click and drag text kerning
Spelling dictionary	●	●	●	●						Catches your spelling mistakes
Hyphenation	●									Improves word spacing in narrow columns
Thesaurus	●									Synonyms are just a mouse click away
Text remains editable when										
• Rotated/skewed	●					●	●			Correct spelling mistakes and make font changes without
• Extruded	●									removing transformations or special effects
• Fit to a curve	●					●	●			
• Enveloped	●									
Recolor characters individually	●	●	●	●		●				No need to separate text string
Number of fonts	253	13	22	15	175	40	4			Target your audience with the right font
Blend shapes and colors	●						●			Realistic shading & novel shape transformations
• Automatic reblends	●						●			Live blending allows for instant feedback
• Blend along a path	●									Blend elements can follow a chosen path
• Blend groups of objects	●									Several objects can be blended at once
• Link blends together	●									Blended objects can remain grouped
True mathematical perspective	●									Object recedes towards a movable vanishing point
Enveloping	●									Warp any object using a rubber-band envelope
Generate 3-D extruded objects	●									Convert 2-D objects to 3-D appearance
• Rotate and recolor	●									Rotate in 3-D space with automatic color refresh
• Simulate light source	●									Create realistic shading with a movable light source
Fit text to path										
• Interactive placement of text	●					●				Click and drag text along path
• Align to baseline, ascender, descender	●						●			Adjust vertical position of text above, below or on path
• Fit multiple text strings to path	●									One path can be used for multiple text strings
• Autoupdate when path is changed	●					●	●			Text reflows automatically when path is altered
Maximum number of layers	Unl.				64		Unl.			Simplify complex drawings with multiple layers
Lock, hide and print layers	●									Extensive layer controls let you work effectively
Number of graphics import filters	16	9	14	7	10	9	5			Import charts and graphics
Number of graphic export filters	18	5	1	5	12	10	12			Export to all popular programs
OLE Support	●		●		●				●	Allows quick access to your drawing
Pantone and TruMatch color systems	●					●				Industry standard color matching systems
CHARTING										
Number of chart types available	79	15	19	35		6				Choose the chart type that best suits your data
• Ring pies, 3-D bar, scatter & surface	●									Add impact using a variety of chart types
• Histograms	●									Show frequency of values in a data set
• Pictographs	●									Show data using a repeated picture
• Dual axes	●	●		●						Allows two sets of values for X or Y
• Bipolar charts	●			●						Split chart at zero point for positive/negative values
Rotate, zoom 3-D charts	●									Interactive 3-D manipulation
Number of series	16000	26	4000	16		1000				Chart more data
Number of pies per chart	Unl.	4	1	6		1				Compare more data sets
Remove and restore pie slices	●			●						Add emphasis by removing slices
DDE links	●	●		●						Update chart data automatically with DDE links
Excel 3.0 import	●		●	●						Use existing Excel data to create charts
Lotus 1-2-3 import	●	●	●	●						Use existing 1-2-3 data to create charts
Harvard Graphics charts import	●			●						Enhance existing Harvard Graphics charts
Sort and exchange data series	●									Organize your data without manual re-ordering
Plot regression lines	●			●						Indicate trends in data
Visual menus	●									Thumbnail samples make menu selection easy
Context sensitive menus	●									Intuitive pop-up menus change to suit context
Free form data input	●			●						No need to enter data in a pre-determined way
Libraries of editable fountain fills	●									Ready-made gradient fills can be modified
On-screen color palette	●									Choose chart element colors on screen
Includes libraries of textured fills	●									Use textures to dress up backgrounds
PRESENTING										
Slide sorter view	●	●	●	●						Reorder, insert and delete slides
Play animated flics	●									Use any Autodesk .FLI or .FLC animation file
Number of animations included	152									Ready-to-use general purpose animations
Number of transition effects	16	13	45	15	4					Variety of transitory wipes used between slides
Control transitions per slide	●	●	●		●					Assign different transitions for each slide
Automatic or manual slide shows	●	●	●	●	●					Timed self-running or manual advance
Play sounds during show	●		●							Use recorded sounds to liven up your show
On screen status line	●									Monitor timing and slide transitions
PAINTING/PHOTO EDITING										
Convert to any color depth	●							●	●	Choose from 1, 256 or over 16 million colors
Select by color or range of colors	●							●	●	Automatically select area(s) based on color
Special effects filters	12							18	27	Apply special effects like motion blur, emboss, etc.
Paint tools: brush, airbrush, paintcan	●							●	●	Create images from scratch using basic painting tools
Flip and rotate images	●							●	●	Allows you to place image as needed
Control of brush sizes and shapes	●							●	●	Adjust to change look of brush stroke
Control transparency & opacity	●							●	●	Create interesting overlay effects
Magic wand selection	●							●	●	Automatically selects irregular areas
Apply filters to selected areas only	●							●	●	No need to cut and paste
Channel response curve control	●							●	●	Adjust color channels as needed
Color replacer	●							●	●	Search and replace colors or range of colors
Cloning tool	●							●	●	Copy one area of image to another area
Preview effects	●									Avoids having to undo and re-apply effect
Automatic locator tool	●									Displays the same area in all active views
Tiling of fills	●									Use a scanned image as a fill pattern

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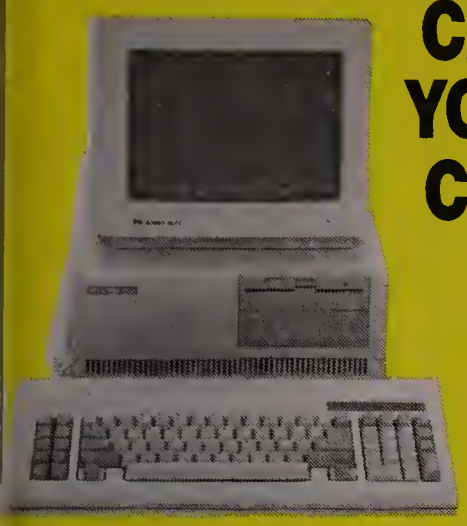

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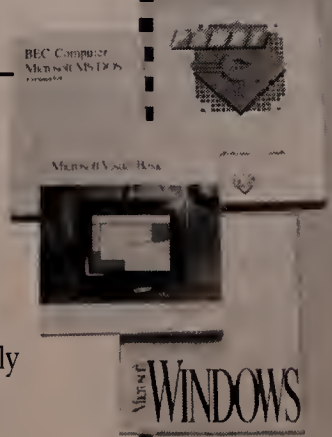

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Here's How

Contents: Spreadsheets 192 | Word Processing 198 | Windows 204 |

HELP LINE Q & A

Tip of the Month

FAST TASK SWITCHING: Mnemonic shortcut keys are easy to use and carry you directly to your open programs. You can also use them to launch programs when you're in Program Manager. Here's how to set them up: In Program Manager, select an icon and press <Alt>-<Enter>. <Tab> to the Shortcut Key text box, and press the key you want to use. *Windows* will automatically add <Ctrl> and <Alt> before it. I use <Ctrl>-<Alt>-W for *Word for Windows* and <Ctrl>-<Alt>-E for *Excel*. Remember to use a key that reminds you of the corresponding program. Now click *OK* and repeat the process for each program for which you want a shortcut key.

If you've assigned a program a shortcut key but the key doesn't switch you to the application, try switching to Program Manager and then pressing the shortcut key. To give Program Manager a shortcut key, drag PROGMAN.EXE from File Manager to the Start-Up group and assign its icon a shortcut key.

Be careful when you assign key combinations. When a program you've assigned a shortcut key is open, no other program can use that key combination for a different purpose—so don't assign combinations that another program can't do without. Also, avoid assigning the same shortcut key to more than one program.

Shane Rau, assistant technical editor

Scan Photos to CD ROM

Q I'm looking for a service that will digitize photographs and put them on a CD ROM. Know of a source?
U. M. Rao, Freehold, New Jersey

A Until recently that was a fairly expensive proposition, but Kodak's new Photo CD scanning service makes it cheap and easy. You just drop off your slides, negatives, or undeveloped film at a local photo shop, and a few days later you get back a CD containing extremely-high-resolution scans of your pictures. (Kodak uses Polaroid's Digital Photo Scanner to digitize the photos.) The cost is around $1.75 per image.

Unless you bought your CD ROM drive very recently, it probably won't be able to read Photo CDs until you upgrade its drivers. Some older models can't read them at all. To find out if your CD ROM drive can play Photo CDs, or for the location of the drop-off point nearest you, call Kodak at 800/242-2424, extension 53. If Kodak tells you your drive doesn't support "multisession" Photo CDs, don't worry about it—that just means you can't send your CDs back to the lab to have them append additional images.

Older graphics and desktop publishing programs won't recognize the Photo CD format. Until you upgrade to Photo CD–compatible versions (dozens are now available), you'll need a copy of Kodak's *Photo CD Access* utility. It lets you copy and paste images from the CD using *Windows'* Clipboard or save the images in TIFF, PCX, BMP, and other popular formats.

- **Photo CD Access for Windows** $39.95; Eastman Kodak Co., 800/242-2424 ext. 53, 716/724-4000 ext. 53
  Reader service no. 651

How Big Is My Drive?

Q I bought my PC with a 120MB hard drive, but DOS's CHKDSK says it's 119MB, *Norton Desktop for Windows* says it's 117MB, and the setup display when I start my computer says 114MB. What should I believe?
Frank Johnson, New York

A The discrepancy arises in part because disk storage values are rounded, but the real culprit in this case is linguistic: Basically, the term *MB* is used three different ways. To computer engineering types, *MB* stands for *megabyte;* 1MB is 1,048,576 bytes (2^{20}) and equal to the square of a kilobyte (KB or K), which is 1024 bytes (2^{10}).

Sometimes *MB* is used to mean *million bytes*. For example, you referred to CHKDSK's output as 119MB, but CHKDSK displays 'total disk space' in number of bytes (written out to the 1's place). Hard drive and system manufacturers usually refer to hard drive storage the same way you did, by rounding the number of million bytes. Furthermore, manufacturers tout a drive's *unformatted* capacity. When you format a disk, some of its space is used to track its use, and sometimes some space is locked out as bad; the remainder is the available storage space (which CHKDSK inaccurately refers to as 'total disk space'). Thus the discrepancy between the vendor's claim and CHKDSK's report.

Sometimes *MB* is used to mean 1000K, or 1,024,000 bytes. For example, 1.44MB floppies hold 1,474,560 (1.44 times 1000 times 1024) bytes (of which only 1,457,664 bytes are available stor-

age space). The Disks panel of System Summary in *Norton Desktop for Windows*' System Information tool shows 117MB, but if you select Summary•Disk, you'll get a value of '117,*xxx* K' in the All Drive Summary.

The 114MB reported by your system setup is the closest to the hard disk's actual size in megabytes, but, of course, that figure is also rounded. Since you know how to view your system setup, you can find the number of cylinders, heads, and sectors; the drive's unformatted capacity is the product of those three numbers times 512 (the number of bytes per DOS sector). If you then click on the C: drive icon in *Norton*'s All Drive Summary, you'll get a C Drive Summary that lists, among other numbers, the 'Start of Data'. The product of that number times 512 is the amount not used for storage. Adding that number to CHKDSK's 'total disk space' should also yield the drive's unformatted capacity in bytes.

Run HyperCard Stacks in Windows

Q I'm looking for a *Windows* program that does more or less what *HyperCard* does on the Mac and can read *HyperCard* stacks.
Curtis Rice, North Vancouver, British Columbia, Canada

A There are a number of *HyperCard*-like multimedia development tools for *Windows*. While none of them can read *HyperCard* files directly, you can use Heizer Software's *ConvertIt* to translate applications (or as Claris calls them, stacks) created in *HyperCard 2.1* or earlier to *ToolBook 1.5* format.

If you can wait a while, conversion may be unnecessary. Claris has already released *Windows* versions of *FileMaker* and *ClarisWorks* that use the same file formats as their Mac counterparts, so *HyperCard* on the PC may not be very far off.

- **ConvertIt for Windows 1.5** $199; Heizer Software; 800/888-7667, 510/943-7667, 510/943-6882 (fax)
  Reader service no. 652
- **ToolBook for Windows** $395; Asymetrix Corp.; 800/448-6543, 206/637-1500, 206/637-1504 (fax)
  Reader service no. 653

Write-Protect Files

Q I often "recycle" my documents, cutting sentences and paragraphs from older drafts as I compose a new one. My problem is, I sometimes forget which document I'm in and accidentally save a chopped-up version of an old draft. I then have to interrupt my work to restore the full version from a backup. How can I avoid this mistake?
Dana Handler, Los Angeles

A One way is to make scratch copies of the old files and cut from them instead. I usually name such files SCRATCH.1, SCRATCH.2, and so on. That way, the file name on screen is a constant reminder that I'm in one of the old files, not the new one. Also, if I forget to erase such files after I'm through using them, the next time I browse their directory, those names remind me to delete them.

Another trick is to make the old files read-only. Most apps will let you do anything you want to a read-only file *except* save it. To make a file read-only at the DOS prompt, enter the command **ATTRIB +R** *filename.ext*, where *filename.ext* is the name and extension of the file (or files, if you use wild-card characters) you want to make read-only. Before you can delete or change a file, you must remove its read-only status: At the DOS prompt, use **ATTRIB -R** *filename.ext*.

To make files read-only using the DOS Shell or *Windows* File Manager, tag the file(s) in the File pane, select (in the Shell) *File•Change Attributes* or (in File Manager) *Properties*, and then select *Read only•OK*.

Delete a Non-DOS Partition

Q When my dealer set up my hard disk, he configured it as two logical drives. The C: drive is a standard DOS volume, but the D: drive uses a special

USER GROUP OF THE MONTH

Atlanta PC Users Group

This month our User Group Tips come from the Atlanta PC Users Group. APCUG members receive a 24-page monthly newsletter and access to a BBS with 87 conferences, about 1GB of shareware, and an on-line newsletter. The group holds monthly meetings that are open to the public, and it offers 22 special interest groups, including SIGs for *WordPerfect, Microsoft Windows*, OS/2, multimedia, and communications.

For more information, contact Jack Bolton at P.O. Box 28788, Atlanta, GA 30358; 404/393-1629, 404/808-4696 (BBS). Yearly membership is $30, $15 for students, $100 for businesses, and $45 for families.

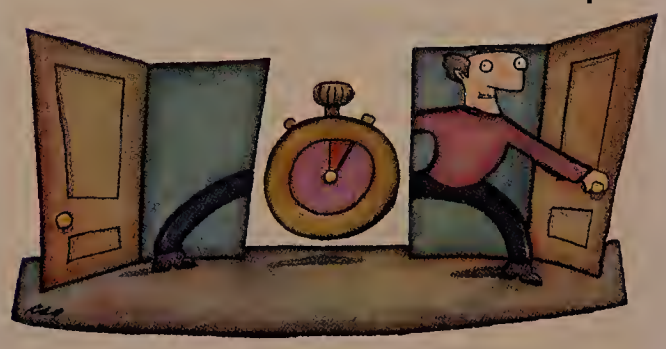
Reader service no. 601

LOGGING TIME: My work requires me to keep a log of how much time I use a program for a given client. For each program, I use a small, handy batch file that inserts the date and time into my log file when I start the application and again when I exit.

The batch file below, for example, records how much time I work in *WordPerfect* for my user group. Make sure that the word *Current* is lowercase except for the initial capital C. And put the batch file in a directory listed in your AUTOEXEC.BAT's PATH statement.

```
@ECHO OFF
ECHO START>>WP-UG
ECHO.|DATE|FIND "Current">>WP-UG
ECHO.|TIME|FIND "Current">>WP-UG
C:\WP51\WP
ECHO STOP>>WP-UG
ECHO.|DATE|FIND "Current">>WP-UG
ECHO.|TIME|FIND "Current">>WP-UG
```

Bob McDearmid
Atlanta PC Users Group



driver to let it exceed DOS 3.3's 32MB limit. Now that I've upgraded to DOS 5.0, I'd like to repartition my disk as one big C: drive, but FDISK won't delete the D: partition. Can you help?
Morris Matthews, Sandy, Utah

A When FDISK punks out, I generally use *The Norton Utilities'* Disk Editor. Its plain-English partition table display makes it very easy to delete a non-DOS partition. (Remember to back up completely—changing and deleting partitions make disk data irretrievable.) To tackle more difficult problems, I use Ontrack's *Disk Manager*. It can handle tricky tasks, like formatting drives with more than 1024 cylinders to work with DOS 5.0, or determining the proper CMOS setup parameters if you've lost the documentation for your drive.

You can also zap the drive by using DOS's DEBUG. (Most drive controllers have a low-level format utility in ROM that you can initiate at the DOS prompt using DEBUG, but you must know the utility's ROM address.) You can use DEBUG to erase the partition table by entering the commands in Figure 1.

```
Prompt     Command
-          A 100
xxxx:0100  INT 13
xxxx:0102  <Enter>
-          RAX
AX 0000
:          0301
-          RBX
BX 0000
:          0200
-          F200 L200 0
-          RCX
CX 0000
:          0001
-          RDX
DX 0000
:          0080
-          P
-          Q
```

FIGURE 1: REMOVE A HARD DRIVE'S PARTITIONS using these DEBUG commands.

- **Disk Manager** $124.95; Ontrack Computer Systems, Inc.; 800/752-1333, 612/937-1107, 612/937-5815 (fax)
  Reader service no. 654
- **The Norton Utilities 6.01** $179; Symantec; 800/441-7234, 408/252-3570, 408/255-3344 (fax)
  Reader service no. 655

Enlarge DOS's Type-Ahead Buffer

Q When my programs are busy performing some time-consuming task, I often continue entering further commands. Unfortunately, I can type only about 15 characters before DOS beeps to tell me its keyboard buffer is full. Then I have to wait for my program to catch up. Is there some way to enlarge the keyboard buffer?
Mitchell Pratt, Belmont, California

A There are many utilities around that will increase the size of DOS's 15-character keyboard buffer. Some are part of software bundles, like *WordPerfect Office*'s RP.EXE and *Super PC-Kwik Power Pak*'s KEYSAVE.SYS. (Neither *The Norton Utilities* nor *PC Tools* offers one, though.) At least a dozen shareware and freeware key buffers can be found on line. Shareware guru Michael Callahan, a.k.a. Dr. File Finder, recommends KBFIX2, 128KEY, and BIGBUF. You'll find them in the Featured in April section of the PC World Online software library; many more key buffers can be found on CompuServe.

Configuring LPT and COM Ports

Q I purchased a pair of one-parallel, dual-serial boards and want to install both of them. I have searched through a stack of manuals and computer books for information on how to set up multiple I/O boards and have found nothing. How do I do it?
C. M. Lin, Weatherford, Oklahoma

A In theory, what you want to do is a fairly simple matter. Set the jumpers on one board for LPT1, COM1, and COM2. That means the parallel port (LPT1) is set to interrupt IRQ7 and address 378; the first serial port (COM1) uses IRQ4 and 3F8; and the second serial port (COM2) gets IRQ3 and 2F8. (Those are the normal factory settings for single-parallel, dual-serial boards.) Configure the other board's ports as LPT2 (IRQ5 and 278), COM3 (IRQ4 and 3E8), and COM4 (IRQ3 and 2E8).

If you have other expansion boards that contain their own serial port, such as an internal modem, you'll have to disable the duplicated serial port on your I/O boards.

You may also have to resolve other hardware interrupt conflicts before you can use all the ports. Because very few people have two parallel ports, IRQ5 is a popular default setting for many expansion boards, and IRQ3 is a very common default for network adapters. If you have boards set to either of those IRQs, you'll have to reconfigure them to use IRQ2, IRQ10, IRQ11, IRQ12, or IRQ15 (the other interrupts are already used). Mouse drivers generally won't work on a port with a shared interrupt, and some (notably Microsoft's) work only on COM1 or COM2. A workaround is to install an InPort or PS/2-style mouse port board, which can coexist with four COM ports. (Note that there are also serial "bus" mouse port boards, which won't help because they take up one of your COM ports.)

Even if you have no hardware conflicts, you're likely to encounter software problems as a result of your COM ports' shared interrupts. It's often impossible to access the devices attached to COM1 and COM3 simultaneously, and the same goes for those on COM2 and COM4.

DOS 5.0 on Low-Density Disks

Q I recently bought a copy of the MS-DOS 5.0 upgrade. The problem is that my old XT can't read the upgrade's high-density disks. Does that mean it won't work with PCs and XTs? If it will work, how can I install it?
Jeff Daugherty
Greensburg, Pennsylvania

A DOS 5.0 will work with older systems, but double-density disks are available only by special order. To obtain them, call Microsoft at 800/227-4679 or 206/882-8080. The new disks will cost you $20.

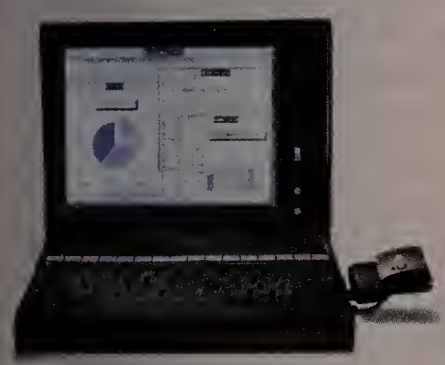
By Robert Lauriston

Robert Lauriston is a regular contributor to PC World.

Mail your questions to Help Line, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Help Line; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

There Is Strength In Numbers.

intel inside



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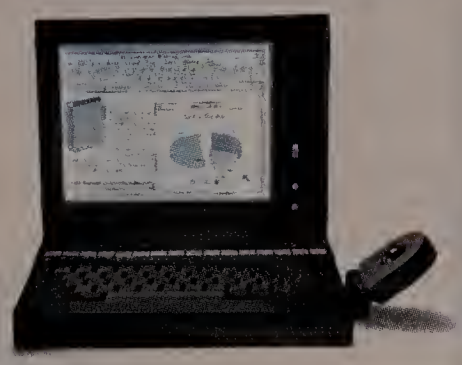

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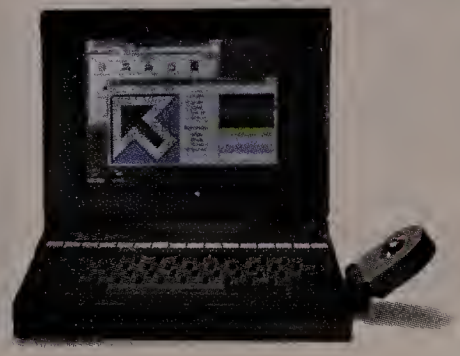

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SPREADSHEETS Q & A

Is Half a Sum Better Than None?

In the November column, I responded to a question from Diane Pearson about how to set up a grand-total formula using *Excel* that excludes the rows containing subtotals. The goal was to make the formula easy to modify when you insert or delete new rows. My method was to hide the subtotal rows and then, while building the SUM() function, use Formula•Select Special (shortcut key <Alt>-<Semicolon>) to select just the visible cells to total.

Many readers have written in to suggest a more elegant solution: Sum the entire column (the values *and* the subtotals) and divide the result by 2. Simple? Yes. A good idea? Not necessarily.

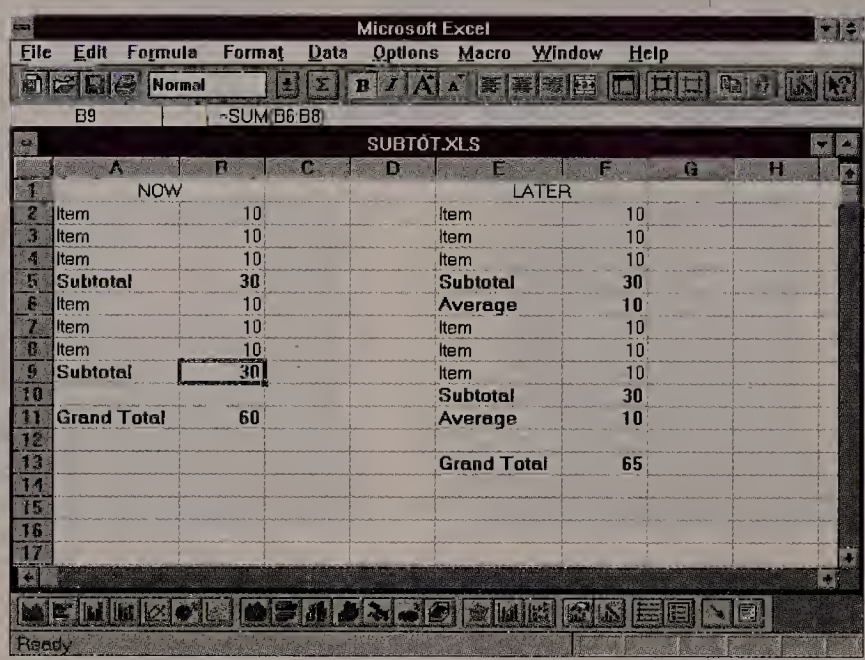

FIGURE 1: ACCIDENTAL WORKSHEET ERRORS, as in cell F13, occur easily when formulas reference extra cells.

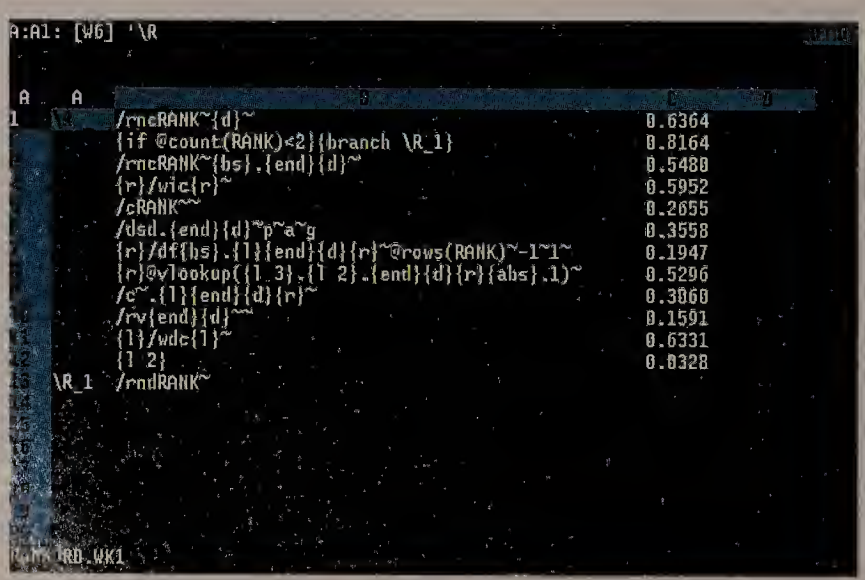

FIGURE 2: THIS MACRO ASSIGNS RANK ORDERS to a list of values—without changing their original order.

The problem with this approach is that it leaves the worksheet open to careless errors later. Look at Figure 1. The NOW version in columns A:B illustrates the suggested solution (the formula in B11 is =SUM(B2:B9)/2). The LATER version in columns E:F shows what could happen later if an unsuspecting user inserted a couple of rows and added formulas (in F6 and F11) to calculate the item averages. The SUM function has stretched to include the inserted rows, and the average in F6 is now included in the sum.

On a small worksheet like this, with dummy data values like these, you notice the problem instantly. In a larger worksheet, though, the grand-total formula might be out of sight when you insert the averages. And with real data values, you might not even notice a small change in a large formula.

Unless there is a compelling reason not to, formulas should contain references only to the data values they require.

1-2-3 Rank Order

Q For my work with *1-2-3*, I need to rank order a rather lengthy list of items. I realize that I can sort the list, but I need to retain the items' original order and simply fill in the ranks in the next column. Should I use a macro to accomplish this task?

Gerald Butz,
New York

A If the list of items is long, you're right—a macro is your best bet. A serviceable one is shown in Figure 2 (but perhaps some of our readers can suggest refinements?). Note that the macro approach described here is appropriate for *1-2-3* and, with modifications, for *Quattro; Excel* users can call on the RANK() function to calculate ranks directly.

To set up the macro, enter all the labels shown and use */Range•Name•Create* to name cell B1 **\R** and cell B13 **\R_1**. To run the macro, put the cell pointer on C1 (the first number in the list) and press **<Alt>-R**. The macro checks to make sure the list has at least two items. If so, it inserts a couple of temporary columns, makes a copy of the original data, sorts the copy, and numbers the sorted values in descending order. Then it uses lookup functions to map the ranks back to the data, thereby preserving the data's original order. (To see how this works, use the Step function—**<Alt>-<F2>**—to walk through the macro step-by-step.)

Here are the details:

/rncRANK~{d}~ creates a temporary range name, RANK, that covers just the first two cells in the list.

{if @count(RANK)<2}{branch \R_1}. If there are fewer than two numbers in RANK, there's nothing to do, so this statement branches to RANK to cover the full list of numbers to be ranked.

/rncRANK~{bs}.{end}{d}~ extends the range name RANK to include all the items on the list.

{r}/wic{r}~ inserts two temporary columns.

/cRANK~~ copies the original data into the first blank column.

/dsd.{end}{d}~p~a~g sorts the copy of the data in ascending order.

{r}/df{bs}.{l}{end}{d}{r}~@rows(RANK)~-1~1~. This statement moves to the next blank column and uses /Data•Fill to number the sorted list. The keystroke sequence {l}{end}{d}{r} extends the fill range so that it's the same length as the sorted list. The start number is @ROWS(RANK), the number of items in the original list; the step value is -1, so the list of ranks decreases incremen-

Flowcharting

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Master Class: Control Charts

Striving for quality improvement (QI) is a standard practice in many manufacturing organizations, and the tools they use can easily be applied to service industries as well.

Let's say that your health clinic has identified long waits as the chief source of complaints from patients. Your quality improvement team has decided to monitor the waiting room for three weeks to find out the length of a typical wait and to discover any special causes. (A process that operates without special causes is "in control." Special causes make a process unpredictable and thus difficult to manage.) You decide to randomly sample six patients each day and plot the waiting times on an *X*-bar chart like the one shown in Figure 1a.

An *X*-bar chart is a line chart that allows you to identify the effects of special causes on a process. In our example, it shows the mean (average) values of a series of random samples from a process, together with the mean of the sample means (the dashed line at about 41), an upper control limit (at 67), and a lower control limit (at 16). If the process is in control, over 99 percent of the sample means will fall between the control limits.

This month I'll show you how to set up the control chart in *1-2-3* release 2.*x*, but the same calculations and basic charting tricks work in *Quattro* and *Excel*, too. Begin by entering the data shown in A4..G19 in Figure 1b (you can enter the dates as labels—just begin each entry with an apostrophe). In N4..N19, enter a series of labels ('- -) to use as graph data labels.

Enter the following formulas into I4..M4, then copy them into I5..M19. Since *1-2-3* 2.*x* doesn't provide a function for standard deviation, the formula in cell I4, (@VAR(B4..G4)*@COUNT(B4..G4)/(@COUNT(B4..G4)-1))^0.5, calculates it: It multiplies the sample variance by the sample size, divides by the sample size minus one, then takes the square root by raising the result to the power of 0.5. In *1-2-3* 3.*x* and *Quattro*, use the formula @STDS(B4..G4); in *Excel*, use =STDEV(B4:G4).

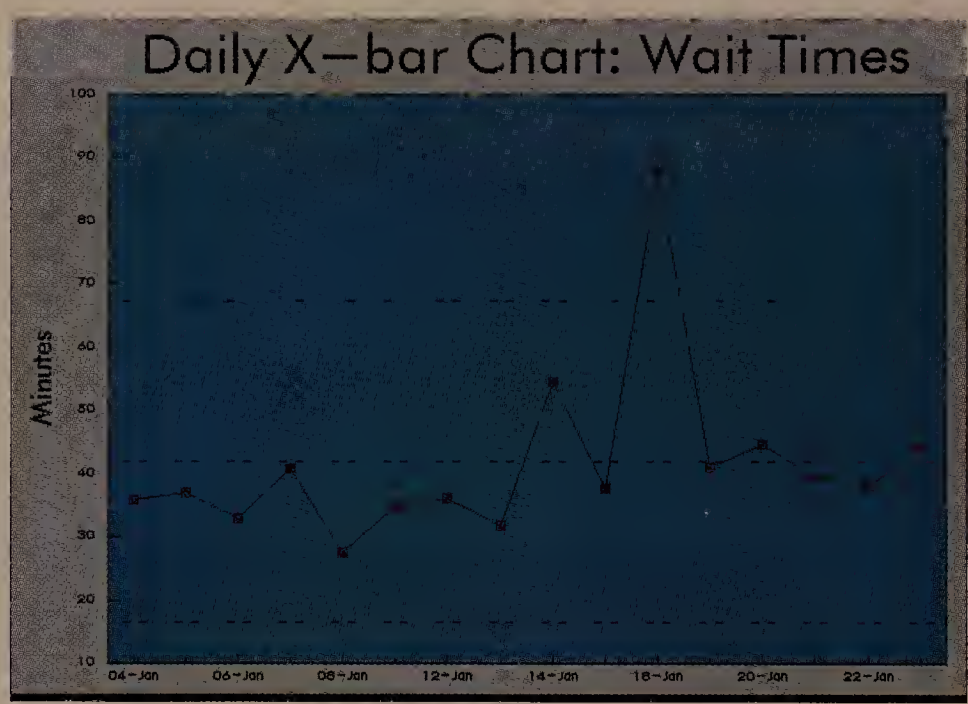
The formula in J4, @AVG(B4..G4), calculates the sample mean, and the one in K4, @AVG(J4..J19), yields the average of the sample means. The dollar signs in the latter formula ensure that copies of the formula will refer to the same range of values.

The formula in L4, +$K4+3*@AVG($I$4..$I$19)/0.9515/@SQRT(6), calculates the upper control limit. That's the grand mean (K4) plus three times the estimated process standard deviation. The constant 0.9515, based on the sample size, is taken from a standard QI text. The formula for the lower control limit, +$K4-3*@AVG($I$4..$I$19)/0.9515/@SQRT(6), in L4 is almost identical.

Once you've copied the formulas, you're ready to set up the graph. The trick here is to use the constant values in K, L, and M to position the mean line and the control limits, but display dashed data labels instead of the regular graph lines. Select */Graph • X* and paint the range A4..A19. Select *A* and paint the range J4..J19. Similarly, set the B range to K4..K19, the C range to L4..L19, and the D range to M4..M19. Select *Options • Format • B • Neither*, repeat the command for data series C and D, and select *Quit*. Now, select *Data-Labels • B*, paint the range N4..N19, and select *Center*. Repeat the command for data series C and D, and select *Quit* to return to the Options menu. Add text using the Titles options, and you're done.

Use the same approach in *Quattro*. In *Excel*, you don't need the data labels; just format the straight lines to dashes using the Format Patterns dialog box.

The chart reveals one day when the waiting times are out of control: January 18. Now, let's see: Was that the day the clinic's PC crashed?



A:I4: [W7] (@VAR(G4..B4)*@COUNT(G4..B4)/(@COUNT(G4..B4)-1))^0.5

C-CHART.WK1: Control Chart: x-bar

	Date	Daily sample values						sd	X-bar	Mean	UCL	LCL		
4	04-Jan	26	26	53	44	36	31		36.00	41.51	66.93	16.09	-	-
	05-Jan	53	53	44	36	31	5	18.01	37.00	41.51	66.93	16.09	-	-
	06-Jan	21	21	37	48	29	42	11.19	33.00	41.51	66.93	16.09	-	-
	07-Jan	34	34	49	36	34	58	10.25	40.83	41.51	66.93	16.09	-	-
	08-Jan	29	29	28	9	26	45	11.45	27.67	41.51	66.93	16.09	-	-
	11-Jan	19	19	63	29	46	33	17.07	34.83	41.51	66.93	16.09	-	-
	12-Jan	37	37	47	17	24	55	14.06	36.17	41.51	66.93	16.09	-	-
	13-Jan	35	35	54	17	36	14	14.61	31.83	41.51	66.93	16.09	-	-
	14-Jan	48	48	102	13	30	86	33.63	54.50	41.51	66.93	16.09	-	-
	15-Jan	26	26	55	31	42	46	11.88	37.67	41.51	66.93	16.09	-	-
	18-Jan	39	39	111	96	178	61	53.33	87.33	41.51	66.93	16.09	-	-
	19-Jan	31	31	28	36	24	96	27.23	41.00	41.51	66.93	16.09	-	-
	20-Jan	47	47	60	21	53	40	13.40	44.67	41.51	66.93	16.09	-	-
	21-Jan	35	35	43	30	27	67	14.53	39.50	41.51	66.93	16.09	-	-
	22-Jan	49	49	74	6	24	27	24.00	38.17	41.51	66.93	16.09	-	-
	25-Jan	82	82	19	20	20	41	30.57	44.00	41.51	66.93	16.09	-	-

C-CHART.WK1

FIGURES 1A AND 1B: SETTING UP AN X-BAR CHART can help monitor the quality of your services.

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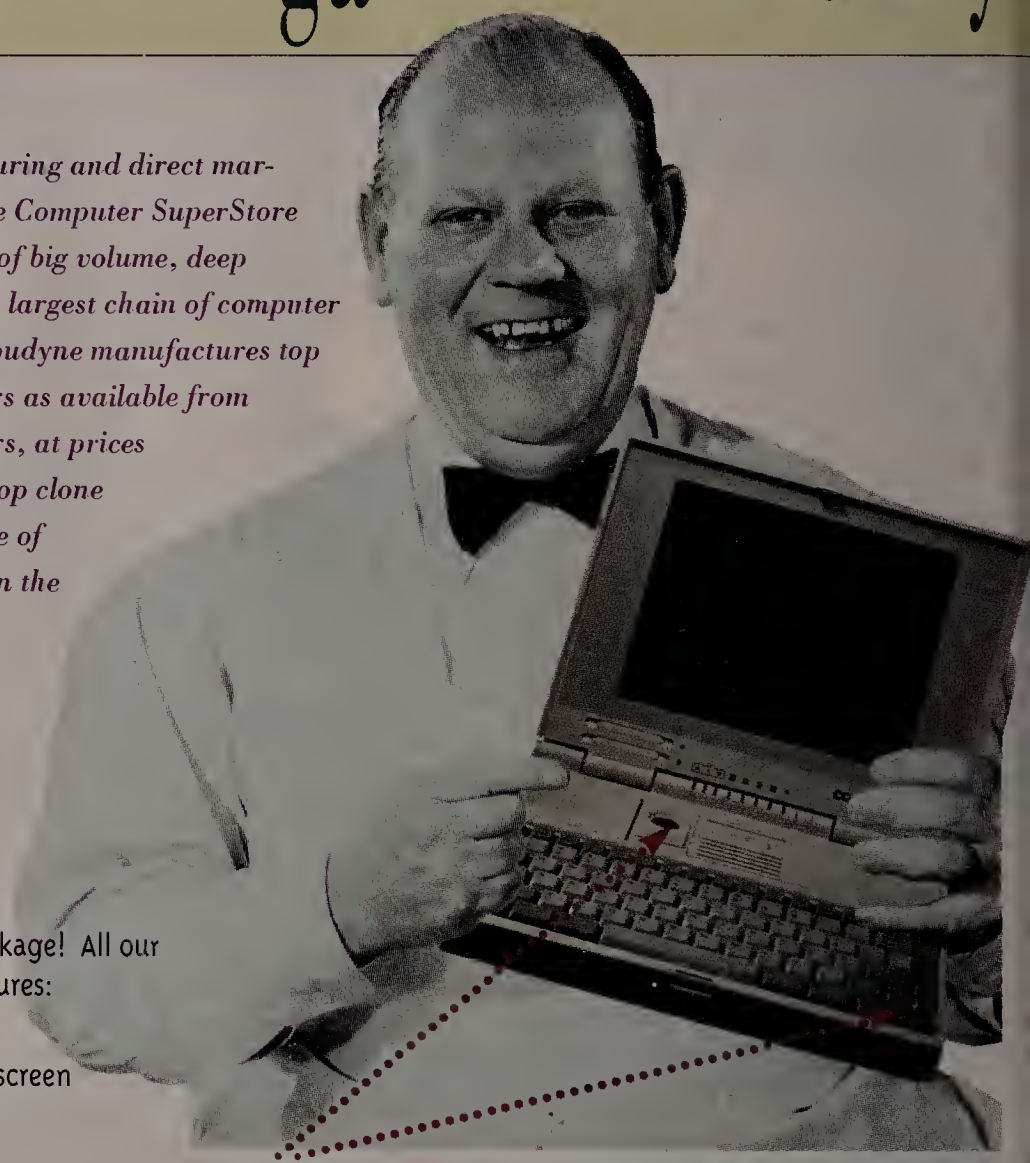

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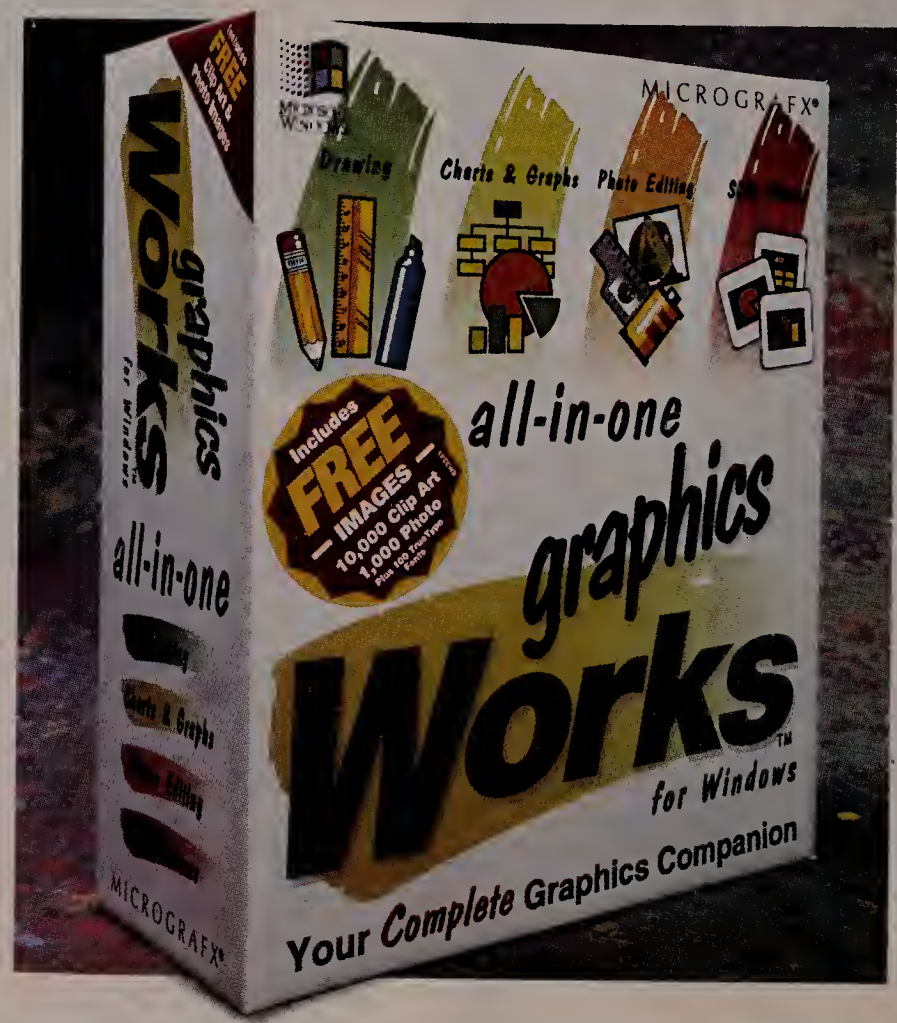

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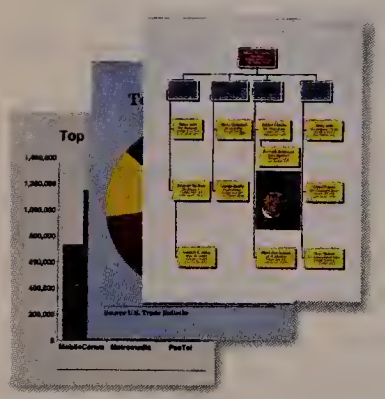

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WORD PROCESSING Q & A

Fixing a WordPerfect Cursor Problem

Q I use *WordPerfect 5.1* for DOS and want to change the shape of my cursor. I've tried the CURSOR.COM program in the *WordPerfect* directory, but it doesn't work. I see my selected cursor shape in the *WordPerfect* title screen, but when the program gets to the editing screen, the eursor reverts to the standard underline character. What am I doing wrong?
Arthur J. Chicoine, Largo, Florida

A *WordPerfect*'s CURSOR.COM program, which is fully described in the manual, is generally a terrific way to change your cursor's shape. For example, a block-shaped cursor is easier to see on laptop screens. As you've discovered though, CURSOR.COM may not work in all cases. While not all displays can handle cursor changes, the fact that the cursor you chose shows up in the title screen demonstrates that your display can use other cursor shapes. What's happened is that you've selected a text screen type that can't handle the cursor change. You need to let *WordPerfect* select your text screen type automatically instead. To switch to automatic display selection, press **<Shift>-<F1>DTA <F7>**. From now on, your cursor should retain the settings you selected.

USER GROUP TIP

Quick WPWIN Text Selection

It's easy to quickly select text with the mouse in *WordPerfect for Windows*. To select a word, click on it twice. To select a sentence, click three times. Want the entire paragraph? You guessed it—click four times. To select everything from one point to the end of the sentence, hold down <Shift> and click three times at that point, or four times for everything from that point to the end of the paragraph.

John Doyle
Atlanta PC Users Group

Going Home in WordPerfect for Windows

Q I recently switched to *WordPerfect 5.1 for Windows* after years of using various DOS versions of *WordPerfect*. Since I also use other *Windows* programs, I bit the bullet and selected the CUA (common user access) keyboard. Everything's working okay, but I really miss the way the DOS version used the <Home> key in combination with the cursor control keys to move around in a document. Is there a way to get this back without giving up the rest of the new keyboard?
Eric Johnston, Minneapolis

A After years of doing the same things, it's tough to change. WordPerfect knows that and offers a built-in solution. To go back to your old <Home> key combinations, start *WordPerfect for Windows*, then select *File•Preferences•Keyboard*. If no keyboard file shows up in the Name field, select *Create*, click the Home Key Works Like DOS WP 5.1 check box in the dialog box, click *OK*, type a file name, and select *Save* and then *OK* to return to the document.

If you already have a keyboard file loaded, you can skip the Create step, select *Edit*, click the Home Key Works Like DOS WP 5.1 check box, and click *OK* twice. From now on, *WordPerfect for Windows* will handle the <Home> key in the old familiar way.

Making WordPerfect Tables Grow

Q I often have to create tables using *WordPerfect 5.1* for DOS, but now I've run into a puzzling problem. When I need to add a row to the table, the Insert command always inserts the new row above the row containing the cursor. I know that there must be a way to add rows to the *end* of the table, but I can't find it. Can you help?
Gloria B. Huang, Charlotte, North Carolina

A I'm not surprised at your problem, since the solution isn't at all intuitive. *WordPerfect*'s table editing menu is somewhat confusing; however, there's an easy answer. Start with your cursor in any cell in an existing table, then press **<Alt>-<F7>** to display the table editing menu. Now, instead of pressing <Insert> to *insert* a row, press **S** to change the *size* of the table. To add one or more rows, press **R**, type the new total number of rows at the prompt, and press **<Enter>**. The new empty rows will appear at the bottom of the table. Similarly, to add new columns to the right side of the table, press **C**, then enter the new total column count. Finally, to return to the document, press **<F7>**.

A Colorful Problem in WinWord

Q I'm having a problem with graphics in *Word for Windows 2.0*. My documents often need to include captured screens from graphics-based DOS programs. I run the DOS program full screen from *Windows* and capture the screen to the *Windows* Clipboard with the <Print Screen> key. I can then paste the image into my *WinWord* document using the Edit•Paste command. But these images always have the same black background as the original and they look terrible when I print them. I can't seem to find a way to reverse the colors to make the screens look presentable. Can you help?
Vinay Mehta, Lennoxville, Quebec, Canada

A That's a tough one, and there's no way to produce a negative image from the Clipboard while using *Word for Windows*. However, I've found an answer for you that employs a program you already have: *Windows'* Paintbrush. Besides solving your immediate color problem, this solution also lets you save your captured screens as files for future use. This trick will also work in other *Windows* word processing programs as long as you're working in 386-enhanced mode. (You can check if you are by clicking on the *Help•About* menu in Program Manager.)

Press **<Print Screen>** as you've done

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before to capture your DOS program's screen. Now, instead of pasting the Clipboard image directly into *WinWord*, fire up Paintbrush (usually in the Accessories program group), and select *Edit•Paste* to paste the graphic onto the Paintbrush screen. You won't see the entire image, but don't use the Paintbrush scroll bars or give any Paintbrush commands other than the ones listed below. If you do, you'll lose part of the image.

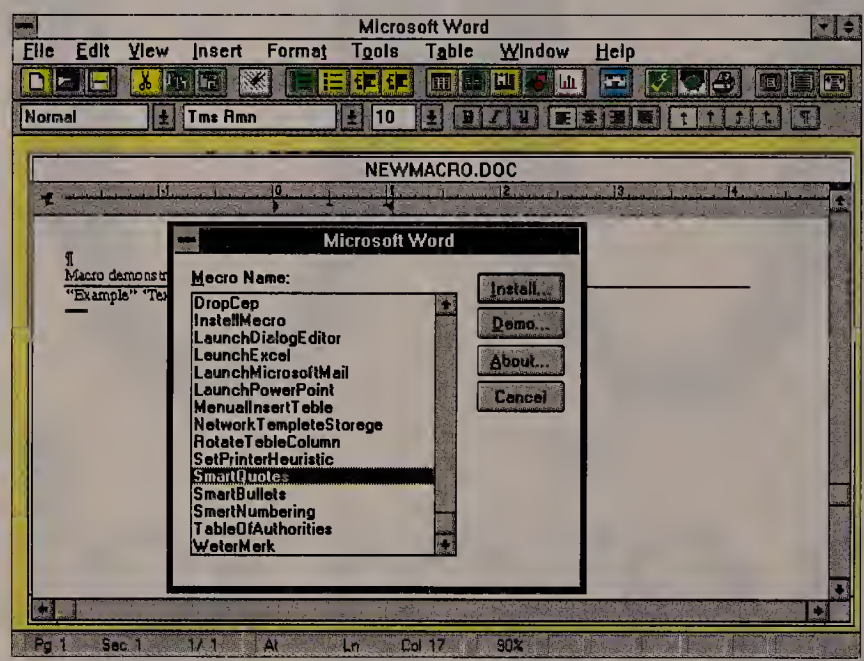

FIGURE 1: WORD FOR WINDOWS OFFERS TYPOGRAPHICAL QUOTES courtesy of its SmartQuotes macro.

First, to reverse the colors, select *Pick•Inverse* from the Paintbrush menu. Once the colors have changed, select *Edit•Copy To*. Type in a file name without an extension for your screen shot, then select *OK*. This saves the image as a *Windows* BMP file. Exit Paintbrush, answering *No* when asked if you want to save changes.

Back in *Word for Windows*, select *Insert•Picture*, choose the file you just saved, and select *OK*. You'll see your screen shot appear in the document and its colors will be reversed. If you need the same screen later, you'll have it on your hard disk.

Smart Quotation Characters in WinWord

Q "True Quotes for WinWord," in your November 1992 column, demonstrated a way to insert true typographical quotation marks in *Word for Windows 2.0* documents using macros. Your method works just fine, but isn't it better to just use the SmartQuotes macro that is supplied with *WinWord 2.0a* or later versions?

Jasmine Goldstein, Los Altos, California

A Good question. I offered the macro technique because it illustrated the way to create a macro that would insert *any* special character. In addition, with individual macros, rather than the SmartQuotes macro included with *WinWord*, you can use either typographical or keyboard quotes in the same document without resorting to a menu. However, the SmartQuotes macro is exceptionally useful, and it also works with single quotation marks. Here's how to install and use this handy tool. (Check out your opening screen when you boot *WinWord* or select *Help•About* to determine if you are using version 2.0a or later; if not, you can contact Microsoft Corporation and request an upgrade at 206/462-9673.)

With *Word for Windows* running, open the file NEWMACRO.DOC (see Figure 1), which you'll find in the main *WinWord* directory. In the dialog box that appears, choose *SmartQuotes* in the Macro Name list box and then select *Install*. You'll see another dialog box. To install the macro into the Tools menu, choose *Tools* in the Menu list box and select *OK•Cancel*. To make the changes permanent, select *File•Save All*. You can then close the NEWMACRO.DOC file or take a look at some of the other handy macros that Microsoft included. To view a description of a macro, select the *List Macros* button, choose the macro, then select *About*. If you find other macros you want to add to your menus, use the Install button as you did with SmartQuotes.

Now, whenever you use *WinWord*, two new entries will appear in the Tools menu: EnableSmartQuotes and DisableSmartQuotes. To use the SmartQuotes tool, select *Tools•EnableSmartQuotes*. You'll notice that, as you type, *WinWord* will convert normal single and double keyboard quotation marks to their typographical equivalents, and it will insert the proper left- or right-facing characters automatically. If you want to resume using normal keyboard quotation marks, select *Tools•DisableSmartQuotes*.

Turning the Tables in Ami Pro

Q I've switched to *Ami Pro 3.0* from *Word for Windows 2.0* and I'm having a minor problem with tables. When I try to import a *WinWord* document containing a table into *Ami Pro*, the data is okay, but there's no table. Is there any way to fix this without going back and retyping the data?

Alvin Tan, Singapore

A While *Ami Pro 3.0* can't automatically re-create tables embedded in an imported *WinWord* document, there's an easy trick to fix things, since *Ami Pro* imports *WinWord* table data with columns separated by tabs and rows separated by carriage returns. Start by importing the document containing the table, then select the imported table's data with your mouse. Make a note of the number of rows and columns, then select *Edit•Cut* to cut the data to the Clipboard.

Now, select *Tools•Tables*, set the number of rows and columns in the dialog box to match your data, and then select *OK*. Click inside the top left cell of the new table and select *Edit•Paste*. Your data will automatically pop into the table, with each entry in the correct cell. The entire job should take you just a few seconds.

By George Campbell

George Campbell is a contributing editor for PC World.

Mail your word processing questions to Word Processing, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Word Processing; CompuServe, 71571,222; MCI Mail, GCAMPBELL; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we can't acknowledge unpublished materials.*

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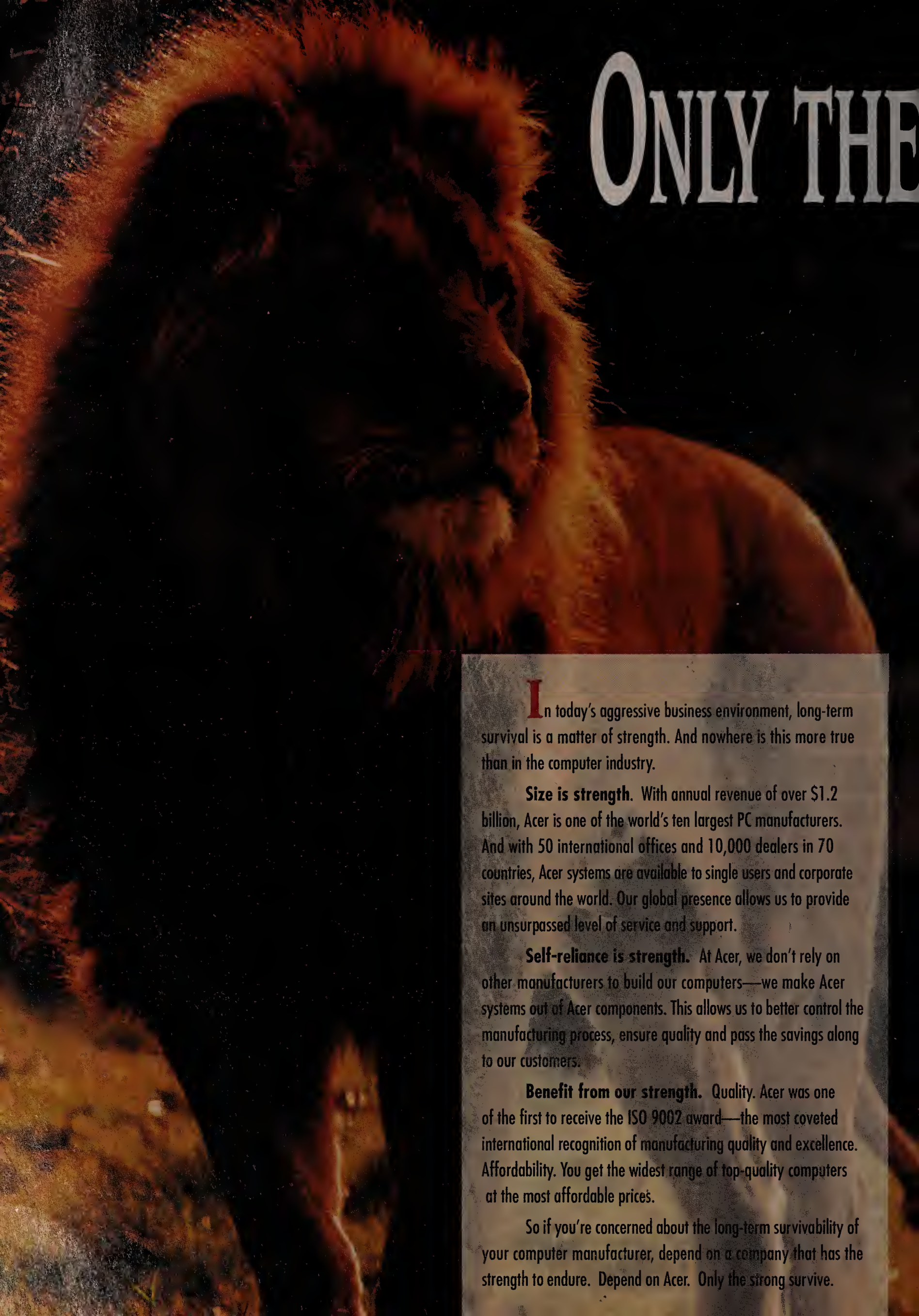

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WINDOWS Q & A

Start Up Without StartUp

Q Is there a way to run *Windows 3.1* and bypass launching applications in the StartUp group? Sometimes I need to access another application first, and with the StartUp group's apps loaded, there isn't enough memory.
Alan M. Cupps, Laramie, Wyoming

A To prevent applications in your StartUp group from loading, simply hold down the **<Shift>** key as soon as the *Windows* logo appears.

Topsy-Turvy EPS

Q When I ran *PageMaker 4.0* in *Windows 3.0*, I had no trouble printing EPS files on my PostScript laser printer. But now that I've upgraded to *Windows 3.1*, whenever I print landscape pages with EPS graphics, the pictures come out upside down. How can I fix this?
Buddy Petsco, Portland, Oregon

A You can correct this problem by adding a line to your WIN.INI file. First, make a backup of WIN.INI. Select *File•Run*, type **WIN.INI**, and press **<Enter>** to edit WIN.INI. Locate the section that defines your printer's settings. The format for this is [*printer,port*], such as [PostScript, LPT1]. (Don't confuse this with the [PrinterPorts] section of the file.) Under this heading, add **LandScapeOrient=270**. Save WIN.INI, restart *Windows*, and your problems are over.

Change of Paste

Q I like the way *Windows* lets me paste graphics from one *Windows* application into another. But can I paste an image from a DOS graphics program into a *Windows* application?
Ron Shapiro
Reno, Nevada

A Yes, as long as your program uses a video mode that is compatible with your *Windows 3.1* video driver. Start *Windows* and then run your DOS application full screen. Then press **<Print Screen>** to copy the entire screen image to the Clipboard. Switch to your *Windows* application and choose *Edit•Paste*. That's it.

If you want to copy only part of a DOS screen, press **<Alt>-<Space>** to wrap the program in a window, and pop open its Control menu. Choose *Edit•Mark*, paint out the area that you want to copy by dragging the mouse pointer or by using the <Shift> cursor keys, and press **<Enter>** (or choose *Edit•Copy* from the Control menu). Switch to your *Windows* application, and paste the graphic.

Case of the Jumpy Cursor

Q When I'm printing, my mouse cursor jumps erratically around the screen, making it difficult to select a menu or click on an icon. I have an IBM PS/2 486 and a Hewlett-Packard LaserJet III with the WinJet 800 attachment from LaserMaster.
Sol Yohalem, Brooklyn

A Like all *Windows* programs, when LaserMaster's WinJet runs out of physical memory, it uses your virtual memory (the swap file on your hard disk). During such disk swapping, your cursor will become jumpy if you are using *Windows 3.1*'s 32-bit disk access.

One way to solve this, then, is to turn off 32-bit disk access. Launch Control Panel, double-click the 386 Enhanced icon, click the *Virtual Memory* button, and then click the *Change* button. Uncheck the Use 32-Bit Disk Access box, then click *OK*, and follow the prompts to restart *Windows*.

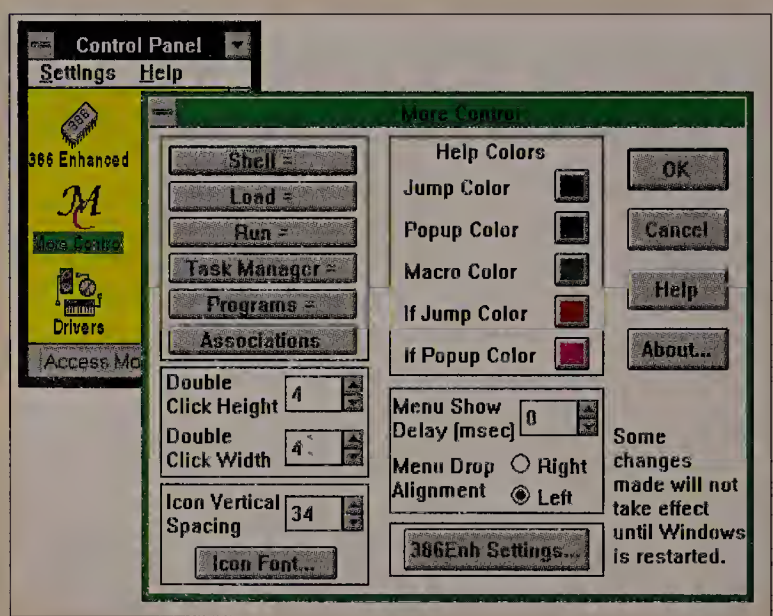
If you prefer to keep 32-bit disk access (so that you can launch more DOS programs and get that extra bit of speed), consider printing your files to disk and then using LaserMaster's WinPrint Manager to print all the queued files while you're at lunch or after work. Consult your LaserMaster documentation for details.

Easy on the Icons

Q The icon labels in *Windows 3.1* are hard to read, especially on a small monitor. Is there any way I can make these titles bigger?
Felix Lee, Winnipeg, Manitoba, Canada

A Sure 'nuff. Although you can't change this setting in the Control Panel, it's easily accomplished by fiddling with the WIN.INI file. First, make a backup copy of WIN.INI in

Windows Toolbox



Tired of digging through WIN.INI or SYSTEM.INI every time you need to tweak some *Windows* setting? *More Control* isn't the complete answer, but it does give you a bit more control over your environment. Just copy the appropriate files to your hard disk and up pops an icon in Control Panel. From *More Control*'s dialog box you can change the color of *Windows* help text, the alignment of drop-down menus, the spacing between icons, the font used for icon labels, and much more. *More Control* is a freeware product from Sloop Software, 719/260-0433, and is available only on line. Look for the file MORECN.ZIP on PC World Online, CompuServe, and other on-line services.

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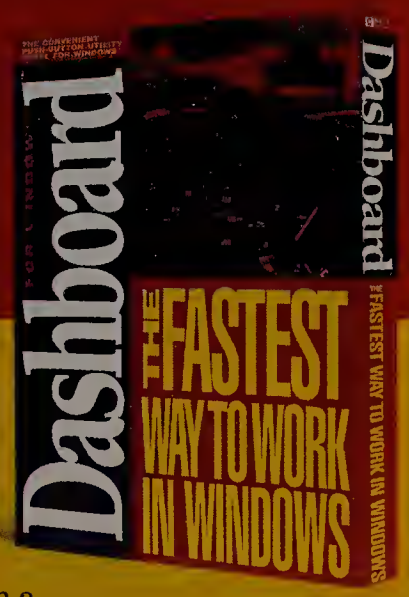

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STANDARD ICON LABELS IN WINDOWS 3.1 CAN BE DRAB OR HARD TO READ. With a few quick edits of WIN.INI, you can use just about any font to make the titles more attractive.

case anything goes wrong. Switch to Program Manager, choose *File•Run*, type **WIN.INI** and click *OK*. When WIN.INI opens in Notepad, locate the [Desktop] section and add the line **IconTitleSize=10**. This boosts the default icon title size from 8 to 10 points. You can set the default MS Sans Serif font to 8, 10, 12, 14, 18, or 24 points. To see this change take effect, save WIN.INI, then exit and restart *Windows*.

You can also change the typeface. To use MS Serif instead, for example, add the line **IconTitleFaceName=MS Serif** to the [Desktop] section. To employ a different typeface, simply substitute another font name for 'MS Serif.' You can use TrueType fonts or PostScript fonts installed via *Adobe Type Manager*, and you can pick any size from 4 to 126 points. Bit-mapped fonts like MS Sans Serif and MS Serif, however, are limited to a handful of specific sizes.

To make sure you get the font names right in WIN.INI, open Windows Write, select *Character•Fonts*, and examine the list of available fonts. Use the exact spelling and spacing shown or this trick won't work; font names are not case-specific, however.

Keep in mind that some *Windows* fonts are off limits. Among them: Wingdings, plus the vector fonts Modern, Roman, and Script, which are identified as plotter fonts in WIN.INI.

For a more elegant approach to modifying your desktop, see "Windows Toolbox" in this month's column.

Compressing your Typecases

Q In the December 1992 "Windows Toolbox," you said that *Typecase* from SWFTE lets you save space by compressing deactivated fonts. This is certainly news to me; I can't find any mention of this capability in the documentation or help file. How do I compress deactivated fonts?
David I. Gould, Toledo

A Simple. In the main *Typecase* window, choose *Options•Other*, click the Compress fonts when deactivating check box, then *OK*. After that, *Typecase* will compress any fonts you deactivate.

By Scott Dunn

Scott Dunn is coauthor of 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992) and a contributing editor for* PC World.

Mail your questions to Windows, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to: PC World Online, Windows; CompuServe, 74055,412; MCI Mail 179-3813; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

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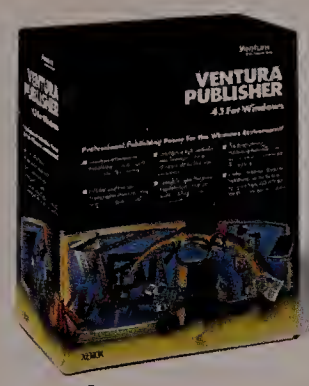

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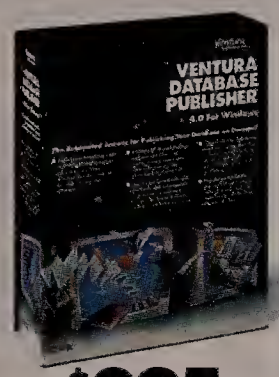

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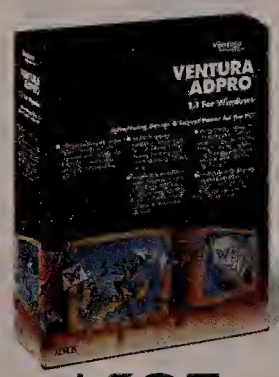

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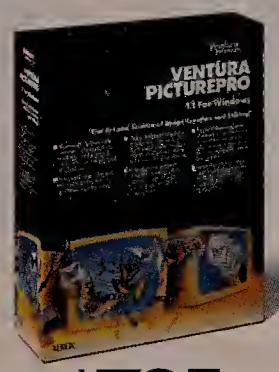

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Circle 243 on reader service card

DATA MANAGEMENT Q & A

Keeping dBASE III Unique

Q My *dBASE III Plus* database requires the user to input a unique ID number for each document logged. What can I do to prevent a user from damaging the database by inputting a number that is already present?
Connie Babore, New York

A *dBASE III Plus* has no built-in feature to assign a unique ID number to each new record automatically. But with a short program and a line in CONFIG.DB (the file that sets defaults when you load *dBASE*), you can make *dBASE* enter a unique ID number in each new record.

Here's how: Create the program shown in Figure 1, in any word processor or text editor, saving it as an ASCII text file called NEWREC.PRG. To use the editor that comes with *dBASE*, enter **MODIFY COMM Newrec** at the dot prompt. Or you can download the file from the Featured in April folder on PC World Online.

NEWREC tells *dBASE* to go to the current data file's last record and read the value in the ID field. The program then adds a new record to the database,

```
IF RECCOUNT() > 0
  place = RECCOUNT()
  GOTO place
  nextnum = id + 1
ELSE
  nextnum = 1
ENDIF
APPEND BLANK
REPLACE id WITH nextnum
EDIT
```

FIGURE 1: FOR UNIQUE ID NUMBERS, use this short dBASE III Plus script.

increases the value by one, and inserts the value into the ID field. To make the program work for you, substitute the name of your own ID field for the 'ID' in the fourth and ninth lines of the listing.

A few caveats: This program assumes that your ID field is numeric—doing this sort of thing with text fields is considerably more complicated. Also, to make sure the record with the greatest ID number is always at the end, your database must be indexed on the ID field, and this must be the active index. A simple **INDEX ON ID TO ID** command will create the index, and if you always remember to open your file with **USE** *filename* **INDEX ID**, you will keep it up-to-date and active.

Now you have to make NEWREC run when you press a function key. The best key to use is <F9>, because this normally runs the APPEND command and is already associated with adding records. To set <F9>, add the line **F9 = 'DO NEWREC;'**—don't forget the semicolon—to your CONFIG.DB file. (If you don't have a CONFIG.DB file, create one that contains only this line.) Again, any text editor will do, and you can use the *dBASE* editor with **MODIFY COMM CONFIG.DB**. If you prefer to reset <F9> temporarily, use **SET FUNCTION 9 TO 'DO NEWREC;'** at the dot prompt. However you choose to set <F9>, you can always go back to *dBASE*'s default with **SET FUNCTION 9 TO 'APPEND'**.

Once you've changed CONFIG.DB, the next time you start *dBASE*, NEWREC will be waiting for you. All you have to do is press <F9> at the dot prompt and you'll get a new record with the next unique ID number.

A Memo on Data Publishing

Q I'm using *Alpha Four*, and my database includes memo fields. I would like to use tabs, justification, and proportional fonts, as well as have the information snake from one column to another. I've tried exporting my data to *WordPerfect*, but I can't figure out a way to export the memo field text. Is there a way to export *Alpha Four* data and memos to *WordPerfect?* If not, is there another program that will format my report?
B. G. Moss, Blacksburg, South Carolina

A *Alpha Four*'s own reporting capabilities are far below your needs, and it can't export memo fields into *WordPerfect*. Luckily, *Alpha Four* uses the same DBF file format as *dBASE*, *FoxPro*, and many other programs, including several report writers. Most of the best data formatting programs available these days require *Windows*, a problem if you're not a *Windows* user.

The one non-*Windows* program I know of that can handle snaking columns and memo fields is DCS's *dbPublisher Pro+*. However, at $495, it's not a cheap investment, and it's harder to learn than most of the *Windows* options I've seen.

The one program I know of that can import your data files, including the memos, to *WordPerfect* is *InfoPublisher*, a *Windows* program by PageAhead Software. Intended as a go-between from data sources to word processors and desktop publishers, *PageAhead* can export *dBASE/Alpha Four* data and memos to the DOS or *Windows* versions of *WordPerfect*.

Then there are the *Windows*-based report writers. As we go to press, Alpha Software itself is preparing to release

A Better dBASE Subtotal

"Summarizing dBASE Data for Graphing" (*Data Management*, November 1992) included a *dBASE* program for copying subtotal information from one data file into another. As Neil Dunlop of Berkeley, California, and a few other readers pointed out, you don't need a program to do this. The *dBASE* TOTAL command will provide subtotals quite nicely for a database indexed on the field being totaled. For instance, to copy sales figures, subtotaled by Product, to a data file called SUMMARY, make sure you're in the sales database and that your Product index is active. Then run the command TOTAL ON product TO summary. *dBASE* will create SUMMARY.DBF with the information you need.

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  Reader service no. 658
- **Report Styler** $199; Alpha Software, 617/229-2924, 617/272-4876 (fax).
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Rounding Currency Values in Paradox

Q I'm using *Paradox 3.5* to track and analyze sales and payroll figures. One of my calculations evenly splits the commission earned. My problem is with money values that have an odd number of cents. When these are divided in half, the result has three decimal places—not an accurate way to deal with money. I can get *Paradox* to display the split commission with only two decimal places, but I know that the third decimal place is still there. How? Because if I press <Alt>-<F5> while editing the field, I get the full three-decimal number. And worse yet, it affects any further calculations. How can I make the rounded number the real one?

Craig McCutcheon
San Bernardino, California

A You didn't say whether your calculation is done in a query or a script. In either case, you can use a short *Paradox* script to round your commission amounts to two decimal places. The script I've prepared for you assumes that you have fields in your table called Commission and Split; for each record in the table, it divides the value of Commission, rounds the result to two decimal points, and saves the final result in the Split field.

To get to the script editor from *Paradox*'s main menu, select *Scripts•Editor•Write*. Enter **ROUNDCOM** as the name of the script, and type in the following text:

```
COEDIT "table"
SCAN
[Split] = ROUND([Commission]/2,2)
ENDSCAN
DO_IT!
```

Put the name of your table between the quotes (" ") on the first line, and change the field names in brackets ([ ]) on the third line to those you need calculated. When you're finished, press **<F2>** to save the script. Whenever you finish updating your commissions, use *Scripts•Play•Roundcom* to create your rounded split values.

By Celeste Robinson

PC World *contributing editor Celeste Robinson wrote* The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992).*

Mail your questions to Data Management, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Data Management; CompuServe, 74055,412; MCI Mail, 179-3813; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.* ■

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PUBLISHING & PRESENTATIONS Q & A

Blazing Bullets With Microsoft Publisher

Q I use *Microsoft Publisher* to produce simple publications, but unfortunately *Publisher* can't generate bullets. The manual suggests using an asterisk or the letter *o*, which looks amateurish, or using the drawing tools to create circles and squares, which is too much work. Got any better ideas?
Mary M. Corley, San Francisco

A There are plenty of easy ways to do bullets, and they'll work with just about any *Windows* program. Most fonts provide special characters like bullets and copyright symbols as part of their extended character sets. To insert them into your *Windows* documents, you need to hold down the <Alt> key and punch in their ASCII character codes using the numeric keypad. For example, to insert standard bullets using *Windows 3.1*'s Arial or Times New Roman fonts, move your cursor to where you want the bullet, turn on Num Lock, hold down **<Alt>**, and type 0149 on the numeric keypad.

But why settle for plain old bullets when you can set off your lists with fingers, arrows, clocks, and other symbols? *Windows 3.1*'s Wingdings font features a variety of special characters that you can use with virtually any *Windows* application. The secret lies in using *Windows*' Character Map utility to copy symbols from your installed fonts and then paste them into your document. Here's how:

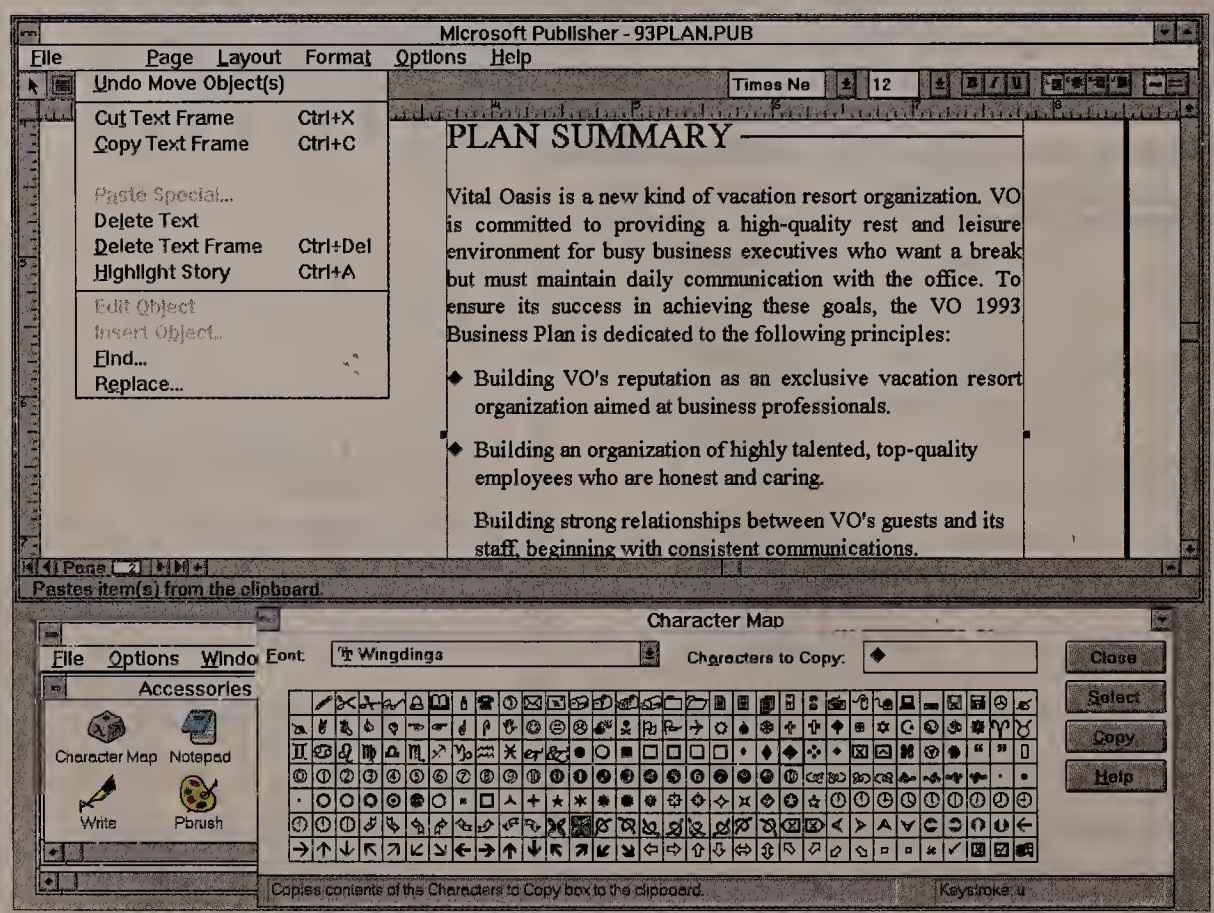
1. With your *Microsoft Publisher* document already open, go to the Program Manager and open Character Map, which normally can be found in the Accessories group.

2. Click on the Font box to view a list of your available fonts and select *Wingdings*. Character Map then displays a grid of all the available characters in the font.

3. Double-click the character you want to use as a bullet. The symbol will appear in the Characters to Copy box. Select *Copy* to copy it into *Windows*' Clipboard, and click *Close*.

4. Return to your *Publisher* document and insert the text cursor in the text frame where you want to add a bullet. Select *Edit•Paste Text* to paste the bullet character from the Clipboard into your document. To add more bullets, just move the cursor where you want the character to appear and repeat the paste command.

Sometimes when you paste in a single character it switches to the default body font. Don't panic—simply highlight the character and select *Format•Character•Font* to change the font back to Wingdings.



ADDING FANCY BULLETS to a Microsoft Publisher document is a snap: Just select a Wingdings symbol from Windows' Character Map, copy it to the Clipboard, and paste it into your Publisher document. You can then move or resize the symbol as you like.

Making the Ventura-Corel Connection

Q I used *CorelDraw 3.0*'s auto-tracing utility to convert a black-and-white scan of a business logo into an Encapsulated PostScript (EPS) file. But when I import the EPS file into *Ventura 4.1* and place it in a document, all I see is an empty box with an *X* in it. Although the document and logo print correctly on my PostScript printer, I'd like to be able to work with the logo on screen. Is there a way to do this?
Dean Carriveau, Spokane

A No problem. The reason your logo isn't displayed on screen is because EPS files created by *Corel*'s tracing utility do not include an *image header*. An image header is a bit-mapped version of the graphic that you can use to position, size, and crop the image inside a document. To add an image header to an EPS file, follow these steps:

1. Open *CorelDraw* and select *File•Import* to open the Import dialog box. Scroll down the List Files of Type drop-down list, and select the Corel-Trace EPS format. Find the directory where your scanned logo file is stored, select the file, and click *OK*.

2. With the image of your logo selected, choose *File•Export* to open the Export dialog box. Scroll down the List Files of Type drop-down list and select the Encapsulated PostScript format. Check the Selected Only box, enter a file name, and click *OK*.

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3. In the Export EPS dialog box that appears next, make sure Low Resolution is checked and click *OK*. (A low-resolution image header requires the least amount of disk space.)

4. Exit *CorelDraw*. There's no need to save the untitled *CorelDraw* file, since you've already exported the EPS version you need.

From this point on you will see the image of your logo when you import the EPS file into *Ventura* as well as most other *Windows* publishing and presentation packages. However, there are a handful of Microsoft's *Windows* applications—such as *Microsoft Publisher 1.0*, *PowerPoint 3.0*, *Word for Windows 2.0*, and *WordPerfect for Windows 5.2*, for example—that can't import *CorelDraw* EPS files with headers. If you use an application such as this, you will still have to use the EPS file without being able to see an image header.

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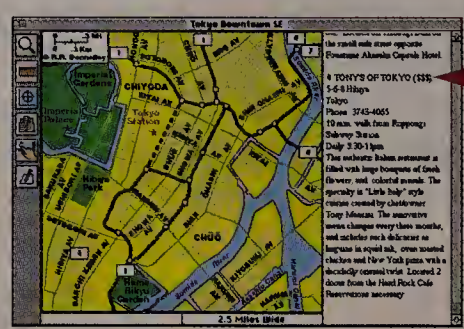

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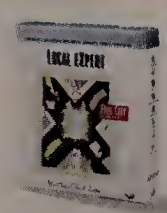

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Q I've started my own small desktop publishing business using *Windows*, and I'm looking for an easy way to create letterheads, logos, and simple drawings. For example, I use *PageMaker* to produce a newsletter for a company that installs wheelchair elevators and van lifts, and I want to include an occasional line drawing of a van or bus. *CorelDraw* is just too complicated for me. Can you recommend a simpler graphics program, or should I just stick with any clip art portfolios?

Richard Duncan, Galway, New York

A Although there are plenty of excellent clip art collections available, you may not find one with the specific images you need. I'd recommend you saddle up a low-cost *Windows* draw program instead. A simple draw program gives you the flexibility to create images for virtually any kind of business publication, and most come with a herd of clip art images that you can customize. One of the best is *Windows Draw 3.0* ($149.95; Micrografx, 800/733-3729), which earned Best Buy honors in our roundup in this issue (see "Draw Programs for the Rest of Us").

Another good choice is *Arts & Letters Apprentice 1.11* ($169; Computer Support Corp., 214/661-8960). These easy-to-use draw packages come with scads of clip art, including wheelchair-access icons and images of transportation vehicles. After you modify the images to your liking or create your own, you can easily export them in a file format that *PageMaker* and other desktop publishing applications can import.

By Richard Jantz

Contributing Editor Richard Jantz is an author and computer publishing consultant in Berkeley, California.

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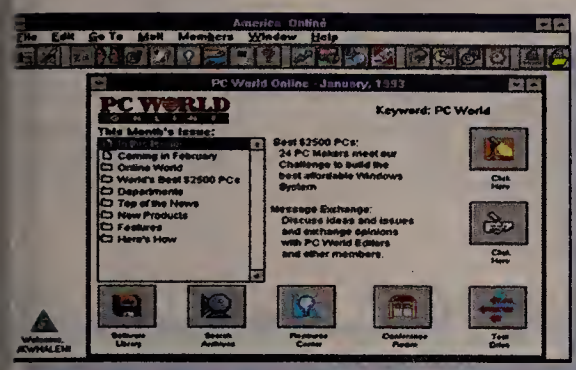

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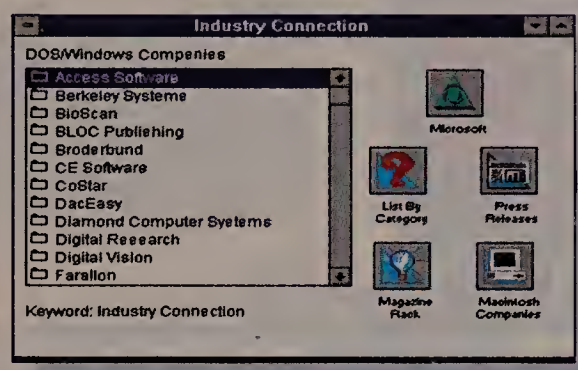

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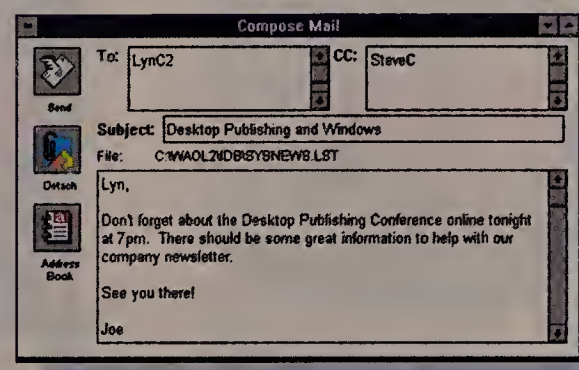

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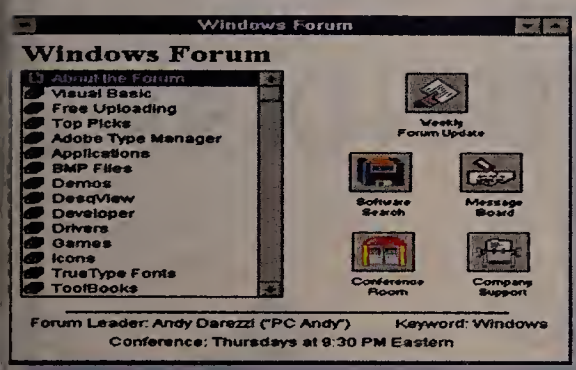

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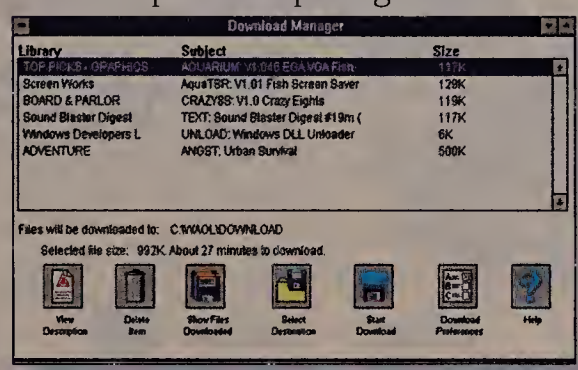

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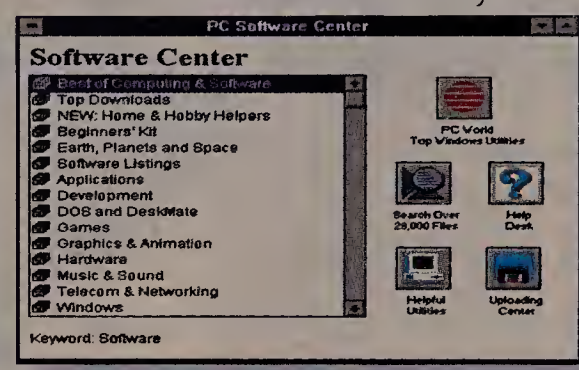

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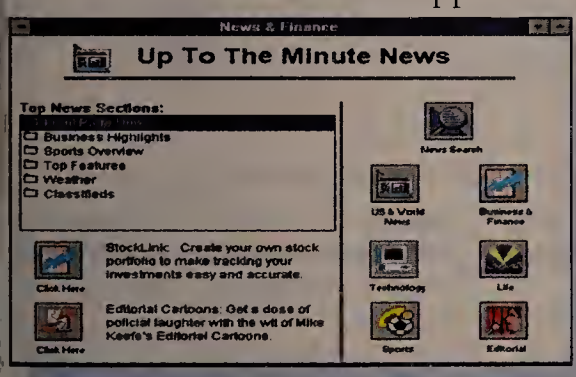

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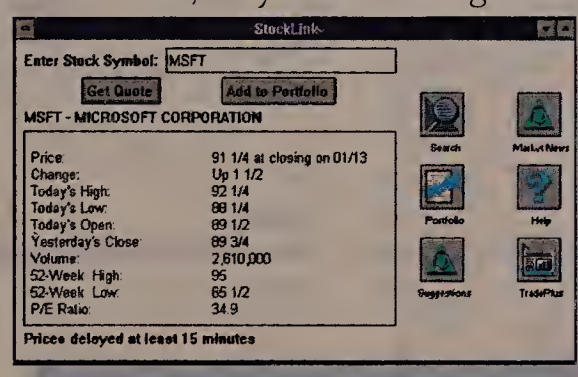

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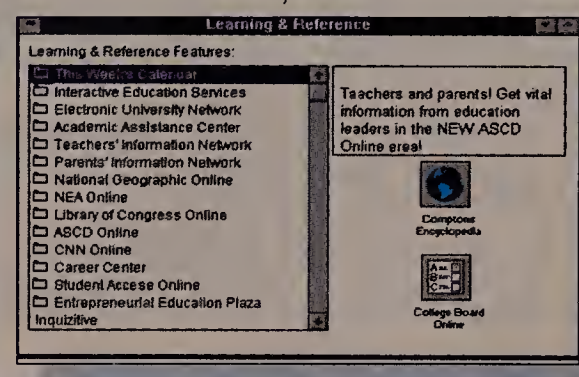

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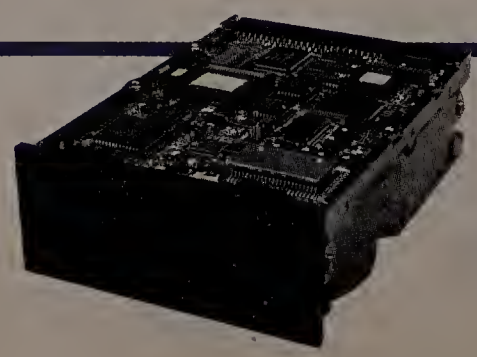

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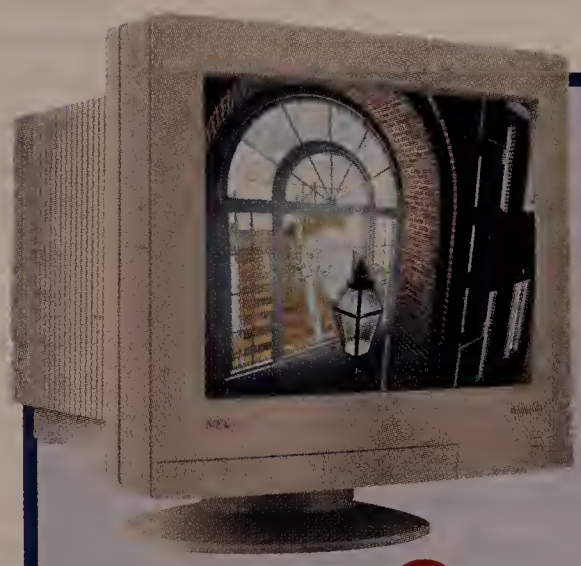

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COMMUNICATIONS Q & A

Modeming Your Pager

Q Do you know of any autodialers that can send text messages to an alphanumeric pager?

Mark J. Krisburg, Oceanside, California

A At the moment, the only program I know of that can do this is Borland's *SideKick*. By the time you read this, however, two snazzy *Windows* packages that offer this capability will be released. *Notify* will enable you to send messages from applications such as *Excel* and *Microsoft Word* to a pager. It's from Ex Machina; 800/238-4738, 718/832-5465 (fax). A DOS version will also be available soon. Both will list for $149. The next version of *The DeskTop Set* will also be able to talk to your pager. It lists for $195 from Okna Corp.; 201/460-0677. You can purchase it directly from Okna for only $89.

Transferring Files Behind the Scenes

Q I'd like to be able to do file transfers in the background while I run other applications. Do you know of any utilities that will let me do this? I currently use *Telix*, and I don't want to use *Windows* or *Desqview*.

Steve Polgar, Ann Arbor, Michigan

A There are some memory-resident utilities that pop applications into the background, but none that will work if you try to coax your communications program to do a file transfer behind the curtain. You might consider switching your communications software to a program that can work in the background.

Crosstalk Mk. 4 from Digital Communications Associates is a good choice. SoftKlone's *Mirror* also has this talent, as does the plain-vanilla communications mode in the remote software *Close-Up* by Norton-Lambert.

One bonus of these DOS communications programs is, they'll give you much better speed and performance in background file transfers than *Windows* communications programs provide.

Troubleshooting in NRAM

Q What is my modem's NRAM? What can I use it for?

Laura Borne, White Plains, New York

A Your modem's non-volatile random access memory, or NRAM, is a chip in the modem that stores configuration settings. Many modems will even let you store phone numbers in NRAM. A Hayes-compatible modem will let you store multiple configuration profiles—usually two—in addition to the factory default profile.

Because many communications programs send exotic commands to the modem, they may leave it catatonic.

In the early days of 9600-bps modems, owners swapped and compared NRAM setups with the zeal of custom Corvette owners. Tweaking the NRAM was what hot-rodded the modem. NRAM is just as essential in 2400-bps modems, though they have fewer commands to set. Old 1200-bps modems don't have an NRAM—their settings are controlled by DIP switches or the communications software.

Storing some of the initialization commands in NRAM is good housekeeping. It speeds up the modem's initialization process and makes the settings semipermanent. And because many communications programs send exotic commands to the modem, they may leave your modem catatonic and unable to dial out with another communications program. You may need to restore one of your modem's NRAM settings or return it to its original factory defaults (with the AT&F command).

Go to your communications software's terminal screen (the first screen you get when you load *Procomm*). Type the AT command that will display the currently active configuration on screen, followed by **Enter**. (You may have to hunt through your manual for this command.) In the case of a Hayes-compatible modem it's **AT&V**, but it may be different for your modem. The modem will display a list of settings. These might look like complete gibberish at first, but don't be scared. There's a list of what the settings control in your modem's manual.

To change these settings, simply type the command and the new value on screen. For example, if call waiting is disrupting your modem's operation, you can instruct it to ride out the call waiting beeps: Increase the amount of time the modem waits after losing a remote carrier before it hangs up. That value is stored in the S10 register. To change the delay time to 10 seconds, type **S10=100** and press **Enter**.

Once you've finished making changes, store the configuration by typing the command **AT&W***n* where *n* is the number of the configuration profile.

Go to your modem's setup screen. Erase any commands that you stored in NRAM from the modem's dialing and initialization strings. Add **Z** to the start of the initialization string to restore your modem to its customized NRAM settings whenever the software is loaded.

If your modem has DIP switches, there may be one to set the modem to load NRAM settings—rather than its factory settings—when it's turned on. Make sure that's in the correct position.

By Judy Heim

Judy Heim is a contributing editor for PC World.

Mail your communications questions to Communications Q&A, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Communications Q&A; GEnie, JUDY.HEIM; CompuServe, 75300,713; MCI Mail, 312-7737; Internet, 3127737@mcimail.com; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

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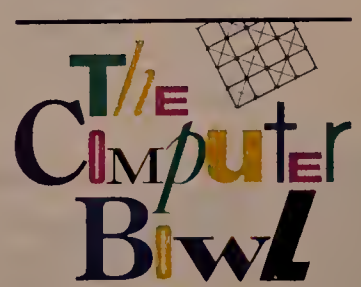

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10889 *ProLinea 4/25s w/240 MB* + --25 MHz 486SX; 240 MB hard drive; 4 MB RAM upgradable to 32 MB; 5¼" Drive; Modem (2400 data, 9600/4800 S/R fax); *Prodigy*; *PFS:WindowWorks*. Purchase additional RAM, Math CoProcessor, Bernoulli Drive, Colorado Tape Backup, or any of over 25 popular programs (incl. *Excel*, *WordPerfect*, *Quattro Pro*, or *1-2-3*) and we'll install and test them for no extra charge. Call for complete list! Order these customized Compaqs by 10 p.m. and we'll ship overnight. (monitor not included) .. **$1499.**
10884 *Samsung SyncMaster 15" Color Monitor (1024 x 768 maximum resolution)* **499.**

COMPUTERS

Compaq Computer ... 3 years
9548 ProLinea 3/25s with 84 MB, Windows *(monitor not included)* ..... $895.
9549 ProLinea 4/25s with 240 MB, Windows *(monitor not included)* ..... 1399.
10891 ProLinea 4/50 with 120 MB, Windows ..... 1839.
10894 ProLinea 4/50 with 240 MB, Windows, 5¼" drive, Modem, Prodigy ..... 2149.
9554 LTE Lite/25c with 84 MB ..... 3199.
9553 LTE Lite/25c with 120 MB ..... 3499.
9552 Contura 3/25 with 120 MB, Windows ..... 1729.
9551 Contura 3/25c with 120 MB, Windows ..... 2249.
9550 Contura 3/25c with 84 MB, Windows ..... 2099.

COMPETITIVE UPGRADES

Please call for criteria to qualify to trade up for these popular products. Policies may vary depending on vendor.

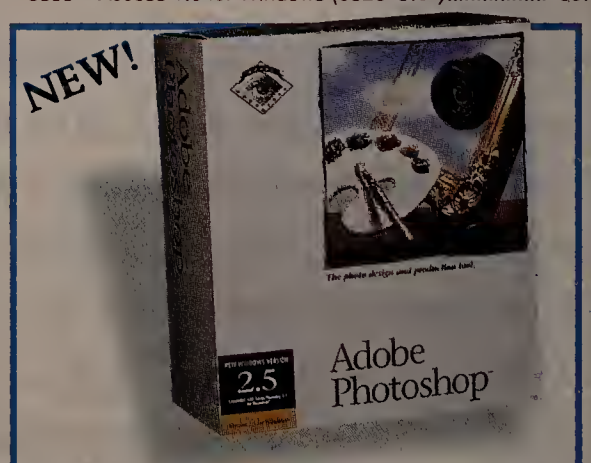
Aldus
11033 FreeHand Windows Comp. Upgrd. *(11034 3½")* 145.
11038 Persuasion Windows Comp. Upgrd. *(11039 3½")* 95.
11036 PhotoStyler Win. Comp. Upgrd. *(11037 3½")*.. 189.
Approach Software
3830 Approach for Windows Comp. Upgrade ..... 95.
Borland International
3684 Quattro Pro 1.0 Windows Competitive Upgrade *(3694 3½")* ..... 89.
Claris Corp.
5228 FileMaker Pro Competitive Upgrade ..... 89.
Microsoft
5693 Excel 4.0 Competitive Upgrade *(5695 3½")* .... 125.
8353 PowerPoint 3.0 Comp. Upgrd. *(8352 3½")* ..... 125.
3881 Word for Windows 2.0A Competitive Upgrade *(7841 3½")* ..... 125.

SOFTWARE

AddStor
8807 SuperStor Pro 1.0 ..... 85.
Adobe Systems
10774 Adobe Photoshop 2.5 for Windows *(3½" only)*. 548.
7547 Adobe Type Manager 2.5 for Windows ..... 45.
6591 Adobe Illustrator 4.0 for Windows *(6439 3½")*. 389.
7940 Adobe Type Set Value Pack *(7941 3½")* ..... 39.
(Entire Adobe Type Library available.)
AGFA
10396 Discovery TrueType Pack ..... 49.
Aldus
1332 PageMaker 5.0 for Windows *(April '93) (4247 3½")* ..... 589.
Altsys Corporation
8675 Fontographer for Windows 3.5 *(3½" only)* ..... 259.
Application Techniques
8337 WinDings 1.0 for Windows ..... 49.
1214 Pizazz Plus 3.0 ..... 79.
Approach Software
6598 Approach 2.0 for Windows ..... 259.
Ares Software
6030 FontMonger 1.06 for Windows ..... 89.
Artisoft
2455 Lantastic AE-2 EtherNet Starter Kit 4.1 ..... 469.
9775 Lantastic AE-2 Starter Kit for Windows ..... 499.
2452 AE-2 EtherNet Adapter Card ..... 199.

Automap
2729 Automap USA for DOS ..... 55.
8569 Automap USA for Windows ..... 55.
Avery Dennison
6006 Label Pro 1.6 *(Laser)* ..... 49.
Banner Blue Software
2088 Org Plus 1.0 for Windows ..... 125.
Berkeley Systems
9885 After Dark 2.0 for Windows ..... 29.
6649 Star Trek: The Screen Saver *(3½" only)* ..... 34.
Bitstream
8040 FaceLift 2.0 for WordPerfect 5.0/5.1 ..... 69.
2089 MakeUp 1.1 for Windows 3.0/3.1 ..... 79.
Borland International
10616 Quattro Pro for Windows *(3½" only) (ends 4/30/92)* ..... 95.
9635 Object Vision 2.1 *(3½" only)* ..... 99.
10710 Paradox for Windows *(3½" only) (ends 4/30/92)* 129.
Broderbund
5900 PC USA 2.0 ..... 29.
5902 PC Globe 5.0 ..... 39.
8855 Print Shop Deluxe 1.0 *(8856 3½")* ..... 45.
Caere
4130 Faxmaster 1.0 ..... 95.
8933 OmniPage Professional 2.1 ..... 629.
Central Point
8114 Backup 7.1 ..... 89.
5039 PC Tools 8.0 *(1475 3½")* ..... 125.
ChipSoft
1663 TurboTax Personal 1040 for DOS Final ..... 49.
3517 TurboTax Personal 1040 for Windows Final *(3½" only)* ..... 49.
6221 TurboTax/Quicken Bundle 10.1/6.0 Final ..... 59.
3080 TurboTax Windows/Quicken Bundle 10.1/2.0 .... 59.
TurboTax State Packages for DOS ..... *ea.* 39.
Claris Corp.
10996 ClarisWorks for Windows ..... 95.
5257 FileMaker Pro 2.0 for Windows ..... 268.
CompuServe
7546 DOS Membership Kit 2.0 ..... 25.
10957 Windows Membership Kit 1.0 ..... 27.
Concentric Data Systems
6575 R& R Report Writer for DOS ..... 159.
9236 R & R Report Writer for Windows ..... 159.
Contact Software
7435 ACT! for Windows ..... 239.
Corel Systems
5506 CorelDRAW! 3.0 *(5508 3½")* ..... 395.
Data Storm
4798 PROCOMM PLUS 2.01 ..... 69.
6918 PROCOMM PLUS 2.01 for Windows ..... 99.
DCA/Crosstalk
5611 Crosstalk 2.0 for Windows ..... 119.
Delrina Technology
2446 WinFaxPro 3.0 ..... 79.
5974 DOSFax PRO ..... 49.
10454 Windows Communications PAK ..... 145.
DeltaPoint
5172 FreezeFrame 1.0 for Windows ..... 62.
8750 DeltaGraph Professional 1.0 for Windows ..... 339.
Fifth Generation Systems
7725 Direct Access 5.1 ..... 64.
3950 Fastback Plus ..... 95.
6431 Fastback Plus for Windows ..... 95.
Fractal Design
7822 Sketcher 1.0 for Windows ..... 94.

Gibson Research
9832 SpinRite II 2.0 ..... 59.
Hewlett-Packard
8731 Dashboard 1.0 for Windows ..... 45.
IBM
7303 OS/2 2.0 Upgrade from DOS *(7305 3½")* ..... 99.
Inset Systems
7298 HiJaak 2.1 115. 3820 1.0 for Windows ..... 115.
Intuit
2426 Quicken 5.0 45. 5596 for Windows ..... 45.
LaserTools
6882 PrintCache 3.1 ..... 49.
9510 PrimeType 1.0 for WordPerfect ..... 62.
Lotus
5417 1-2-3 3.4 *(5416 3½")* ..... 399.
5653 1-2-3 2.4 *(5652 3½")* ..... 335.
2755 1-2-3 1.1 for Windows *(2756 3½")* ..... 309.
3424 1-2-3 1.1 for Windows Upgrade *(3428 3½")* .. 99.
5799 Ami Pro 3.0 ..... 239.
1847 Ami Pro 3.0 Competitive Upgrade ..... 99.
3523 Freelance Graphics 2.0 for Windows *(5005 3½")* 349.
10753 Improv for Windows *(3½" only)* ..... *intro. price* 99.
1493 Organizer for Windows ..... 99.
5981 SmartSuite *(5982 3½")* ..... 469.
MECA
2798 Managing Your Money 9.0 ..... 32.
4603 TaxCut 1992 37. 3885 for Windows ..... 37.
State Tax Packages ..... *ea.* 29.
Microcom
6234 CarbonCopy Plus 6.1 ..... 129.
4410 CarbonCopy Plus 1.0 for Windows ..... 129.
Micrografx
3627 Windows Draw! 3.0 *(3628 3½")* ..... 99.
MicroLogic Software
5350 TrueType 1.0 for DOS ..... 49.
8579 MoreFonts 3.0 ..... 75.
Microsoft
8355 Access 1.0 for Windows *(8326 3½")* ..... 89.



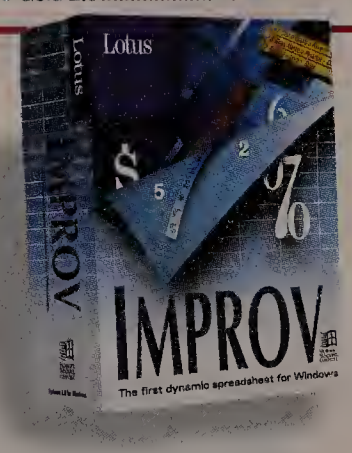
Adobe Systems
10774 *Adobe Photoshop 2.5 for Windows*— Image editing & photo manipulation. Import illustration files, do delicate retouching, & more. Incl. dodge & burn & quick mask for easier object selection *(3½" only)* ..... **$548.**

Get the ProLinea 4/50!

7010	Windows 3.1 *(7009 3½")*	$89.
6224	Windows for Workgroups Upgrd. *(6249 3½")*	89.
6141	Windows for Workgroups Add-on *(6172 3½")*	59.
2735	Works 2.0 for Windows	129.
3337	Publisher 1.0 for Windows	129.
7387	PowerPoint 3.0 for Windows *(8423 3½")*	299.
6195	Word 2.0 for Windows	299.
2856	Excel 4.0 for Windows *(5680 3½")*	299.
7388	Project 3.0 for Windows	445.
8137	Office 3.0 for Windows *(8138 3½")*	449.
1620	MS-DOS 5 Upgrade *(1623 3½")*	59.
10058	FoxPro 2.5 for DOS *(10059 3½")*	299.
10056	FoxPro 2.5 for Windows *(10057 3½")*	299.
10051	Font Pack 2 for Windows	45.
1624	Visual Basic 2.0 Windows Standard Edition	129.
	MicroSpeed	
8659	Cursor Deluxe 1.0	27.
	Nolo Press	
2982	WillMaker 4.0	35.
	Norton-Lambert	
2753	Close-Up for Windows & DOS Dual Pack 4.0 *(2754 3½")*	125.
	Panacea	
2413	WinSpeed 1.0 *(Windows accelerator)*	55.
	PC-Kwik	
4924	Super PC-Kwik 5.01 *(4922 3½")*	49.
4925	PC-Kwik Power Pak 3.0 w/Power Disk *(8004 3½")*	79.
	Peachtree	
5757	Accounting 5.0 for Windows	79.
	Personics	
9288	Laptop UltraVision 2.1 *(3½" only)*	59.
	Polaris Software	
4395	PackRat 5.0	249.
	Portfolio Software	
10459	DynoDex for Windows	49.
	Power Up	
10582	myHouse	59.
	Qualitas	
7539	386MAX 6.02	59.
	Quarterdeck	
3221	Expanded Memory Manager 386 6.0 *(3217 3½")*	59.
4586	DESQview 386 2.4 *(4585 3½")*	129.
	Reality Technologies	
6572	WealthBuilder 3.0 *(includes Smart Investor)*	94.
	Reference Software	
4396	Grammatik V	55.
7483	Grammatik V for Windows	55.
	Shapeware	
5426	Visio 1.0 for Windows *(3½" only)*	199.
	Sofnet	
5883	FaxWorks 2.5 *(Windows & DOS) (3½" only)*	45.
	Software Marketing Corporation	
5147	Orbits 1.0	36.
5145	Bodyworks 1.0	45.
	Software Publishing	
3482	Harvard Graphics *(5276 3½")*	399.
4403	Harvard Graphics for Windows *(4402 3½")*	369.
	Spinnaker	
10900	Address Book & Tax Cut for Windows *(3½" only)*	42.

Delrina Technology
10454 *Windows Communications PAK*—Solves all your communications needs. This value packed bundle includes the award-winning *WinFax PRO 3.0, Crosstalk for Windows*, and *SuperStor Pro* ..... **$145.**

	Stac Electronics	
1409	Stacker 3.0	$95.
	Symantec	
3784	The Norton Backup 2.0 for Windows *(3786 3½")*	99.
3146	The Norton Utilities 6.01 *(5136 3½")*	115.
2359	The Norton Desktop 2.0 for Windows *(2360 3½")*	115.
8378	Norton PC Anywhere 4.5 *(8535 3½")*	119.
10856	Actor Professional 4.1 for Windows	329.
	TIMESLIPS	
5698	Timeslips Release 5	189.
	Touchstone Software	
7420	Check It Plus 3.0	85.
	Traveling Software	
4407	LapLink Pro 4.0	99.
	Walt Disney Computer Software	
10100	Aladdin Print Kit 1.0 *(3½" only)*	15.
9984	The Animation Studio 1.0	72.
	WordPerfect Corporation	
3804	WordPerfect *(3795 3½")*	269.
3494	WordPerfet for Windows *(3497 3½")*	279.
	XTree	
8328	XTree 1.0 for Windows *(8957 3½")*	65.
6161	XTree Gold 2.5	95.



Lotus
10753 *Improv for Windows (3½" only)*—The first dynamic spreadsheet for Windows! Analyze your data with Improv's "dynamic views" that let you rearrange your spreadsheet without rebuilding it.. *intro price* **$99.**

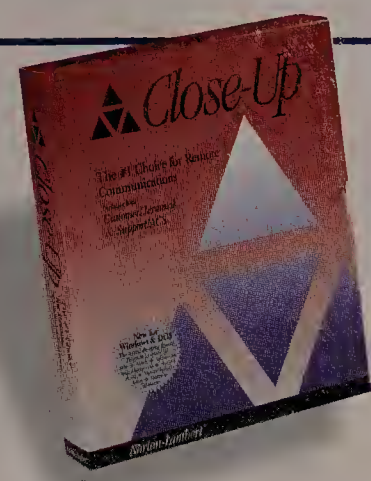
HARDWARE

Warranties listed next to manufacturer.

	3 Com ... lifetime (conditional)			
3453	EtherLink II/16	159.	3469 II/16 TP	169.
	American Power ... 2 years			
7108	Smart UPS 400	339.	7105 Smart 600	439.
3819	Back-UPS 250	115.	3858 Back 400	179.
7107	Back-UPS 450	215.	3823 Back 600	295.
	Appoint ... limited lifetime			
2469	Thumbelina PC or 2480 MousePen Pro PC		*ea.*	59.
9564	Gulliver *(black)* or 9565 Gulliver *(gray)*		*ea.*	59.
	ATI Technologies ... 5 years			
8463	VGA Wonder XL24 *(with 1 MB)*			149.
2012	Graphics Ultra *(with 1 MB)*			209.
3886	Graphics Ultra + *(with 2 MB)*			339.
3871	Graphics Ultra Pro *(with 2 MB)*			519.
	Boca Research ... 5 years			
10468	SVGAX3 *(with Bit BCT acceleration)*			149.
7150	BOCARAM/AT PLUS *(2 MB)*			169.
7139	*(4 MB)*	239.	7138 *(8 MB)*	449.
6998	I/O Board for AT	49.	6999 for PS/2	89.
8380	BasicVGA	49.	8381 SuperVGA	115.

800-800-0003

PC Connection
6 Mill Street
Marlow, NH 03456
SALES 603-446-0003 **FAX** 603-446-7791



Norton-Lambert
2753 *Close-Up for Windows & DOS Dual Pack 4.0*—*PC Magazine*'s Editors' Choice for controlling PCs miles away by modem. *PC World*'s "Best Buy" for remote communications *(2754 3½")* ..... **$125.**

	Caere ... 1 year	
8158	Typist Plus Graphics	299.
	Canon ... 1 year	
	We are an authorized Canon Service Center.	
7893	BJ-10ex BubbleJet Printer *(4.6 lb.)*	255.
7809	BJ200 BubbleJet Printer	369.
8940	BJ-C800 Color BubbleJet Printer	1899.
7897	BubbleJet Ink Cartridge *(BJ-10ex)*	23.
	Cardinal ... lifetime	
8690	MVP241 Modem Value Pack	39.
7667	MVP96IF FaxModem Value Pack	195.
	CoStar ... 1 year	
10300	Address Express	689.
	Creative Labs ... 1 year	
8578	Sound Blaster	99.
	2336 Sound Blaster Pro	189.
5770	Sound Blaster 16	229.
	Curtis ... lifetime	
7358	Command Center SPF-4	79.
	Cyrix Corporation ... 5 years	
9877	FasMath 83S87-16 *(SX compatible)*	69.
9875	FasMath 83D87-25 or 9876 83D87-33	*ea.* 89.
	Diamond Computer ... 5 years	
10079	Stealth 24 Graphics Accelerator	165.
8333	SpeedStar 24X Graphics Accelerator	165.
	Epson ... 2 years	
	We are an authorized Epson Service Center	
5555	AP-3250 *(80 col., 200 cps, 24 pin)*	199.
2358	LQ-570 *(80 col., 252 cps)*	259.
2361	LQ-870 *(80 col., 330 cps)*	489.
2357	LQ-1170 *(136 col., 330 cps)*	669.
10784	Action Laser 1500 *(1 MB)*	889.
10752	ES600C Color Scanner *(requires interface kit)*	895.
	Hauppauge Computer ... 1 year	
4008	Win/TV	439.
10593	Win/TV, Microsoft Video for Windows Bundle	459.
	Hayes ... 2 years	
9039	Accura 2400 *(ext.)*	85.
	9033 *(internal)*	79.
7391	ULTRA 96 Modem	599.
	5024 ULTRA 144	669.
1345	OPTIMA 24 Modem	125.
	3522 OPTIMA 96	349.
8187	OPTIMA 24+FAX96	159.
7395	OPTIMA 144+FAX144	479.
	Hewlett-Packard ... 1 year	
7620	DeskJet 550C *(color) (with ink cartridge)*	789.
9993	LaserJet IIIP *(with toner)*	1099.
6442	LaserJet 4 *(with toner)*	1499.
	Intel ... 3 years	
3864	14.4EX Modem	469.
1086	Matched Memory Classic Memory Board ØK	95.
8479	Above Board ISA ØK	179.
5994	Modem 400	399.
	5995 Modem 400E	399.
5999	FAXability Plus *(software)*	52.
6003	FAXability Plus OCR *(software)*	165.
2994	EtherExpress 16 or 3021 16 TP	*ea.* 129.
	MATH COPROCESSORS	
4750	80387SX *(all 80386SX CPU's)*	79.
5409	80387DX *(all 80386DX CPU's)*	85.
	I/O Designs	
8121	Ultimate Laptop SL Carry Case	52.
8113	Ultimate Laptop EX Carry Case	59.

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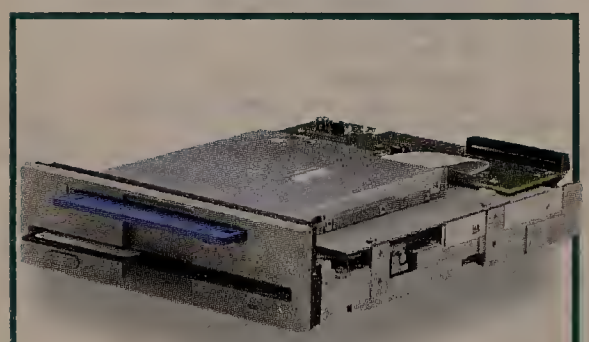
Compaq. Overnight. $5.

Kensington Microware ... 1 year
Full line available. Partial listing.
2582 MasterPiece Plus..... $95. 2587 Remote.. $105.
10748 MasterPiece Compact ..... 59.
10410 NoteBook Traveler PC Deluxe Case..... 75.
7899 Expert Mouse *serial*... 99. 7900 *bus*..... 115.
Key Tronic ... 3 years
4518 101 Plus Keyboard ..... 99.
4387 Trak 101 Keyboard *(with trackball)* ..... 165.
KOSS Corporation ... lifetime
5459 HD-4 speakers with equalizer ..... 49.
Logitech ... limited lifetime
3996 Trackman2 *(combo)* ..... 79.
2343 Trackman Portable ..... 99.
7975 ScanMan 256.. 269. 1015 ScanMan Color .. 599.
3295 Mouseman *(combo)*.... 69. 9766 *(cordless)* .... 89.
10573 Mouseman with TaxCut 1992 for Windows..... 99.
MediaVision ... 3 years
5637 ProAudio Spectrum 16 ..... 199.
7873 Fusion CD 16 *(internal)* ..... 519.
5638 MultiMedia PC Upgrade Kit 16 ..... 969.
10735 CDPCXL ..... 1099.
7580 T3144 Internal 14.4 S/R Fax/Modem ..... 529.
10514 P2144 14.4 Pocket Fax/Modem ..... 379.
10515 C5144 14.4 Fax/Modem *(Compaq LTE/Contura)* 499.
10803 CC3144 14.4 credit card Fax/Modem ..... 499.
Microsoft ... lifetime
7597 Microsoft Mouse *(bus or serial)* ..... 85.
1896 Ballpoint Mouse *(serial only)* ..... 119.
2898 Mouse with Windows 3.0 *(bus or serial)* ..... 149.
MicroSpeed ... 1 year
6007 PC-TRAC Trackball *serial* ..... 75.
Microtek ... 1 year
5187 ScanMaker II 879. 5175 ScanMaker IIXE 1099.
Mouse Systems ... lifetime
3213 PC Trackball II *(serial)* ..... 55.
7878 PC Mouse III *(serial)*.. 69. 5427 NewMouse .. 62.
Mustek ... 1 year
7778 PrinScan105... 179. 7780 Color Artist Pro ... 399.
8455 6000C Color Scanner for Windows ..... 999.
NEC ... 2 years
4252 MultiSync 3FGX Monitor *(14")* ..... 689.
4249 4FG Monitor *(15")*.... 799. 3151 5FG *(17")* 1449.
Okidata ... 1 year
We are an autorized Okidata Service Center.
5093 OL400 Page Printer *(4 ppm)* ..... 649.
9590 OL810 Page... ..... 1089.
3025 Toner Cartridge ..... 25.
Pacific Data ... lifetime/60 day MBG
Memory upgrade for LJ IIP, III, IIID, IIIP:
7055 2 MB..... 119. 7759 4 MB ..... 199.
7959 4 MB Upgrade for LaseJet 4 ..... 165.
5729 ProTracer *(personal CAD printer) (1 yr.)* ..... 1099.
PC Power & Cooling ... 2 years
9537 CPU Cooler *(for 386/33 up to 486)* ..... 29.
3203 Turbo Cool 200 149. 7915 Turbo Cool 300 159.
Practical Peripherals ... lifetime
8993 PM2400 V.42bis *(int.)* 115. 8994 *(external)* 125.
5437 PM2400F Pocket Modem ..... 115.
5429 PM2400EFX SAV.42 bis *(external)* ..... 145.
5428 PM2400EFX V.42 bis *(internal)* ..... 139.
7934 PM9600SA Modem ..... 289.
1344 PM2400FX96SA *(external modem/fax)* ..... 99.
3803 PM14400FX *(internal modem/fax)* ..... 359.
9234 PM14400FXPPM Fax/Modem ..... 359.
2425 PM14400FXSA *(external modem/fax)* ..... 399.

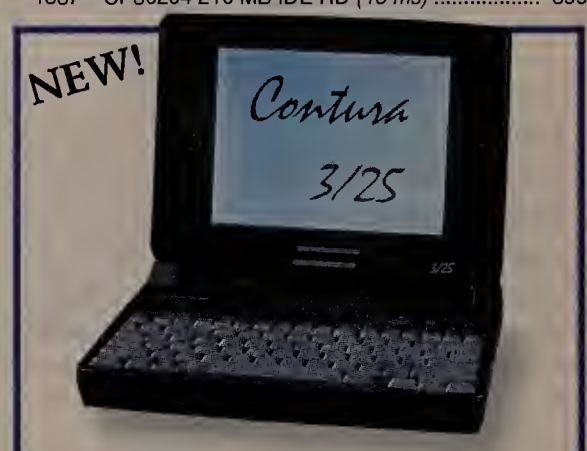


TEAC ... 1 year
4414 *3½"/5¼" Dual Floppy Drive*—Get two drives in one. TEAC's new Dual Floppy Disk Drive gives you both 3½" and 5¼" in one, saving you space and money ... **$145.**

Targus ... lifetime
1305 Universal Notebook *(computer case)* ..... $69.
Technology Concepts ... 2 years
6315 Fax Line Manager 203 ..... 125.
TheComplete PC ... 2 years
6069 TheComplete Modem Plus V.42 bis *(internal)* ... 79.
10555 TheComplete Modem with RapidFAX ..... 89.
8593 TheComplete Communicator Gold ..... 389.
Tripp Lite ... 2 years
6199 Isobar 4-6 *(4 outlets, Gold Seal Warranty)* ..... 49.
6200 Isobar 6-6 *(6 outlets, Gold Seal Warranty)* ..... 59.
9312 BC500 Power Backup ..... 219.
Video Seven ... 7 years
7362 WIN.VGA 1 MB *(1024 x 768, 256 color)* ..... 129.
9261 WIN.FRO 1 MB *(1280 x 1024, 256 color)* ..... 175.
Zoom Telephonics ... 7 years
1166 AMX 2400 Baud External Modem ..... 59.
1307 Internal 2400 Baud with 9600 Baud Fax Modem 69.
1178 Ext. 2400 Baud with 9600 Baud Fax Modem..... 92.
1494 Ext. 9600V.32..... 195. 3075 Internal..... 195.
3574 Ext. 2400 Baud V.42/9600 Baud Fax..... 115.
3386 FaxModem AFC *(2400 baud 96S/48R)* ..... 49.
4430 FaxModem AFX *(2400 baud 96S/48R)* ..... 69.
4429 FaxModem VFP V.32bis 14,400 baud *(internal)* 199.
4428 FaxModem VFX V.32bis 14,400 baud *(external)* 239.
7921 Pocket FaxModem ..... 87.

DRIVES

Colorado Memory Systems ... 1 year
4194 Jumbo 120 Tape Backup ..... 149.
4354 Jumbo 250 Tape Backup ..... 215.
1213 Trakker 120 Tape Backup *(parallel)* ..... 359.
1073 Trakker 250 Tape Backup *(parallel)* ..... 429.
Conner Peripherals ... 1 year
2339 CP30104H 120 MB IDE HD *(19 ms)* ..... 299.
1337 CP30204 210 MB IDE HD *(16 ms)* ..... 399.



Compaq Computer ... 3 years
9552 *Contura 3/25 with 120 MB*—25 MHz 386SL notebook weighing in at just over 6 lbs. This high powered system includes 4 MB RAM, 64K cache, built-in trackball, 120 MB IDE hard drive, & 640 x 480 display **$1729.**

IOMEGA ... 1 year
6499 Transportable 90 PRO ..... 659.
10452 Transportable Multidisk 150 ..... 849.
6343 PC Powered 90 *(includes PC2B & cartridge)*... 499.
6344 PC Powered 90 PRO *(includes PC2B, cartridge & Central Point Software)* ..... 599.
10537 PC Powered 150 ..... 799.
10457 Dual Multidisk 150 ..... 1699.
2500 PC2B-2 Controller ..... 149.
2530 90 MB Cartridge..... 149. 2467 Tripak ..... 439.
8480 Tape250 Insider Tape Backup ..... 239.
8481 Tape250 Inside Half-Height Tape Backup ..... 259.
10702 Tape250 Parallel Port Tape Backup ..... 429.
8482 Tape250 PC Powered Tape Backup ..... 359.
10103 21 MB Floptical Drive *(internal)* ..... 459.
NEC ... 2 years
6582 CDR74 Portable CD-ROM Drive ..... 629.
6581 CDR84 Internal CD-ROM *(reqs. interface)* ..... 569.
Peripheral Land, Inc. ... 1 year
8736 Infinity 88 MB Removable *(Syquest)* ..... 699.
Quantum ... 2 years
8287 Plus Hardcard II XL 105 MB *(9 ms)* ..... 325.
4735 Hardcard E7 127 MB IDE *(17 ms)* ..... 329.
4714 Hardcard E7 240 MB IDE *(16 ms)* ..... 549.
TEAC ... 1 year
6951 1.2 MB Drive for AT ..... 65.
4670 1.44 MB Drive for PC/XT *(3½")* ..... 59.
4326 1.44 MB Drive for AT *(3½", with Bastech)* ..... 75.
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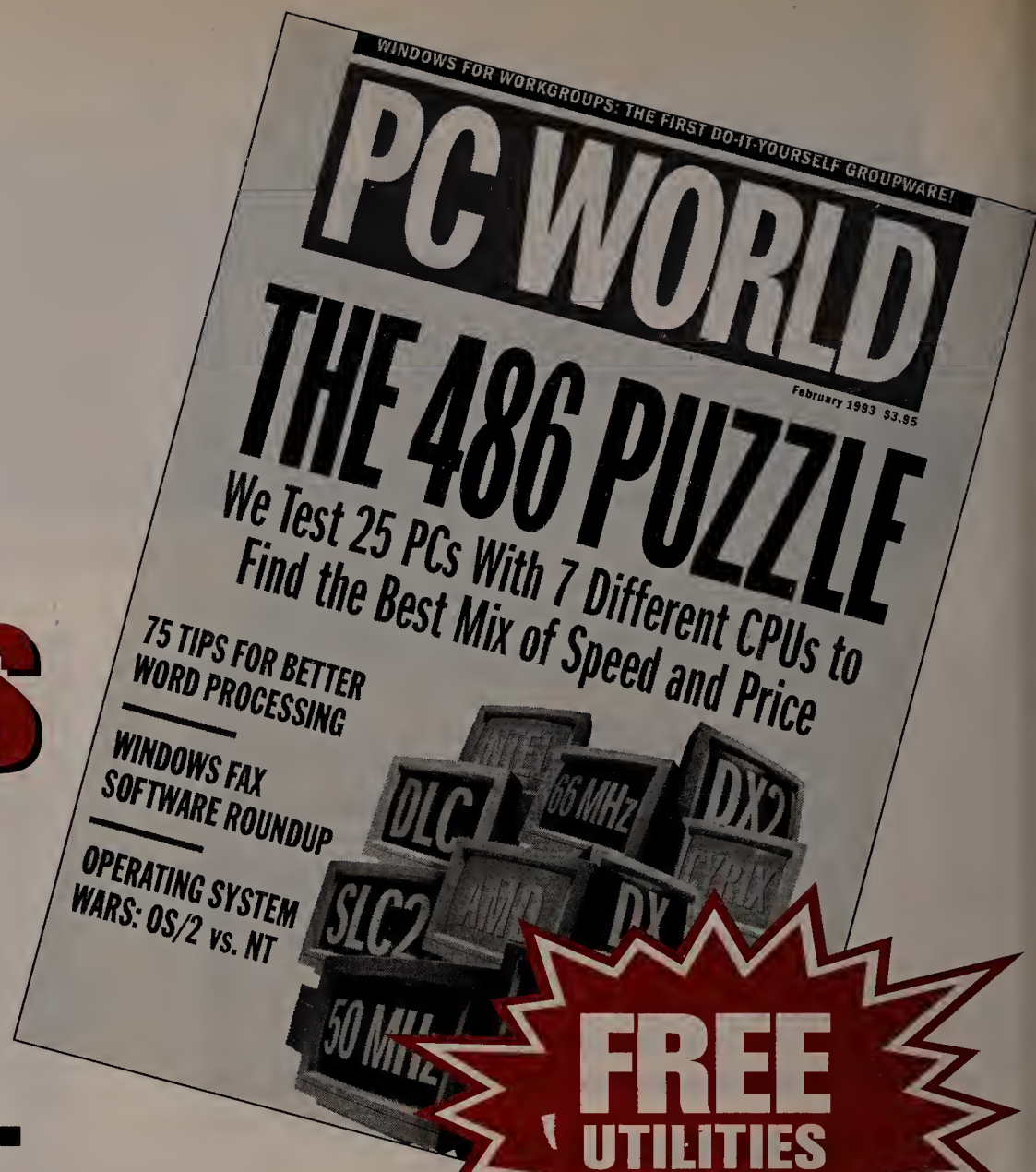

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3ABC7

STAR-DOT-STAR TIPS

Floppy Disk Snoop

Ever need to check a floppy disk to see whether it's high density or low density? Or find out what operating system or utility was used to format the disk? Or want to know how many files will fit into the disk's root directory? Since DOS's CHKDSK utility does not provide all this information, I wrote a Qbasic program, BOOTREC.PAS, which reads the boot sector information from any standard DOS floppy disk.

To use this program, copy it into a text file and save it as **DRIVINFO.BAS** [Figure 1]. Then enter the command **QBASIC /RUN DRIVINFO** at the DOS prompt. The program displays the size and density of the disk, the number of bytes in each sector, the number of sectors in a cluster (the unit of space DOS uses to allocate space for files), the number of reserved sectors, the number of copies of the file allocation table (normally two), the number of files that will fit in the root directory, the total number of sectors on the disk, the name of the program used to format the disk, the number of sectors per FAT, the number of sectors per track, the number of sides (heads), the number of hidden sectors, and the total number of clusters on the disk.

Vincent D. O'Connor
Babbitt, Minnesota

Editor's note: This handy utility gives you far more information about a floppy disk and how it has been formatted than DOS's CHKDSK command. As editor of this column, I often receive disks in unusual formats—including single-sided and 320K disks. If your machine balks at accepting such disks, or if you want to reformat them to allow

```
DEFINT A-Z
DECLARE FUNCTION DriveInfo! (X%)
DECLARE FUNCTION DriveInfo1! (X%)
DIM SHARED BootInfo(0 TO 274)
FOR I = 0 TO 17: READ BootInfo(I): NEXT I
CLS : LOCATE 3, 1: PRINT "Drive (ENTER to end): ";
DO
  Drive$ = UCASE$(INPUT$(1))
  IF Drive$ = CHR$(13) THEN SYSTEM
LOOP UNTIL Drive$ >= "A" AND Drive$ <= "Z"
BootInfo(4) = ASC(Drive$) - 65: PRINT Drive$
BootInfo(7) = 0
DEF SEG = VARSEG(BootInfo(0))
CALL ABSOLUTE(VARPTR(BootInfo(0)))
DEF SEG
IF BootInfo(18) <> 0 THEN
  BEEP
  PRINT "Drive error - press any key"
  WHILE INKEY$ = "": WEND
  SYSTEM
END IF
SELECT CASE DriveInfo!(21)
  CASE 0, 240
    PRINT "3.5 inch high density floppy disk"
  CASE 248
    PRINT "Hard or RAM disk"
  CASE 249
    IF DriveInfo1!(24) = 9 THEN
      PRINT "3.5 inch low density floppy disk"
    ELSE
      PRINT "5.25 inch high density floppy disk"
    END IF
  CASE 252, 253, 254, 255
    PRINT "5.25 inch low density floppy disk"
  CASE ELSE
    PRINT "Unknown disk type"
END SELECT
PRINT "Sectors per track:     "; DriveInfo1!(24)
PRINT "Number of heads:       "; DriveInfo1!(26)
PRINT "Formatted using: ";
FOR I = 3 TO 10: PRINT CHR$(DriveInfo!(I)); : NEXT I
PRINT
PRINT "Bytes per sector:      "; DriveInfo1!(11)
PRINT "Sectors per cluster:   "; DriveInfo!(13)
PRINT "Reserved sectors:      "; DriveInfo1!(14)
PRINT "Copies of FAT:         "; DriveInfo!(16)
PRINT "Root dir capacity:     "; DriveInfo1!(17)
PRINT "Total sectors:         "; DriveInfo1!(19)
PRINT "Media descriptor byte: "; HEX$(DriveInfo!(21))
PRINT "Sectors per FAT:       "; DriveInfo1!(22)
PRINT "Hidden sectors:        "; DriveInfo1!(28)
NumClusters! = DriveInfo1!(19) \ DriveInfo!(13)
PRINT "Total clusters:        "; NumClusters!
PRINT : PRINT "Press any key to continue..."
WHILE INKEY$ = "": WEND
DATA 232,24064,3614,-18401,0,441,-17920,-1,-3191,-15485
DATA 22051,9677,626,-16335,24221,17545,7969,-28469

FUNCTION DriveInfo! (X%)
  DEF SEG = VARSEG(BootInfo(0))
  DriveInfo! = PEEK(VARPTR(BootInfo(19)) + X)
  DEF SEG
END FUNCTION

FUNCTION DriveInfo1! (X%)
  DriveInfo1! = DriveInfo!(X%) + DriveInfo!(X% + 1) * 256
END FUNCTION
```

FIGURE 1: GET VITAL DISK STATISTICS with DRIVINFO.BAS, a Qbasic program that tells you everything you ever wanted to know about your floppy.

them to store more data, this utility will help you scope out the situation. According to Mr. O'Connor, the program also works on some hard drives; however, I had no success getting it to operate on anything but a floppy. I'd therefore recommend this utility for floppy disks only. DRIVINFO.BAS is available in PC World Online's Featured in April folder.

Delete to Order

In *Word for Windows* I often want to delete everything from the current insertion point to the next occurrence of a particular character, but not delete that character. This macro [Figure 2] lets you do that, and if you assign it to a shortcut key, it does it in two keystrokes—a lot fewer than the <F8> Extend Selection command requires.

Abe Casper, San Francisco

Editor's note: This macro is handy for deleting to the end of a phrase, sentence, or paragraph. To do the latter, I press <Ctrl>-W (the key combination I attached to this macro), then press <Enter>. To delete a sentence, it's a simple <Ctrl>-W<Period>.

To create the macro, select *Tools•Macro*, type **DeleteToCharacter**, and select *Edit*. Enter the text of the listing into the resulting window. If you often need to delete to a character that isn't included in this macro, you can modify it. Just add to the height of the dialog box by increasing the second number (182) in the third line, then add more push buttons to the dialog box and case statement. Or you can simply replace one of the existing buttons with a new one. An ASCII version of this macro, DELCHAR.WWM, is available in PC World Online's Featured in April folder.

```
Sub MAIN
DoIt = 1
Begin Dialog UserDialog 13B, 1B2, "Delete To..."
PushButton 24, 7, B3, 24, "&Enter"
PushButton 24, 33, B3, 24, "&, Comma"
PushButton 24, 60, 83, 24, "&; S-colon"
PushButton 24, B6, B3, 24, "&: Colon"
PushButton 24, 113, B3, 21, "&. Period"
PushButton 24, 148, 83, 24, "&Cancel"
End Dialog
Dim dowhat As Dialog UserDialog
On Error Goto Bye
ToDo = Dialog(dowhat)
CharRight 1, 1
Select Case ToDo
  Case 1
    ExtendSelection \
    Chr$(13)
  Case 2
    ExtendSelection ","
  Case 3
    ExtendSelection ";"
  Case 4
    ExtendSelection ":"
  Case 5
    ExtendSelection "."
  Case 6
    DoIt = 0
End Select
If DoIt = 0 Then Goto Bye
CharLeft 1, 1
EditClear
Bye:
End Sub
```

FIGURE 2: DELETE FROM AN INSERTION POINT to a specific character with this Word for Windows macro.

Since the point of this macro is quick keyboard deletes, attach it to a shortcut key. Select *Tools•Options•Keyboard*. In the Macros box, select *DeleteToCharacter;* in the Shortcut Key box, type or select the key of your choice.

This macro should be much shorter and more powerful, but *Word for Windows'* macro language won't allow it. If WordBasic had a command that let you pause a macro until the user pressed a key, then returned that keystroke to the macro (a capability that *WordPerfect* for DOS' macros has), you could accomplish the same goal with a three- or four-line macro that could delete to *any* character.

The Pause That Refreshes

In the November 1992 *Help Line* column, reader Paul Hoffman asked for a way to pause his system during CONFIG.SYS processing. While *PC World*'s suggested method, pressing the <Pause> key, does work, I often find the messages scroll by so quickly that they're gone before I can press <Pause>.

```
N PAUSE.SYS
E 0100 FF FF FF FF 00 80 3A 00
E 010B 45 00 50 41 55 53 45 20
E 0110 20 20 00 00 00 00 0D 0A
E 011B 50 72 65 73 73 20 61 6E
E 0120 79 20 6B 65 79 20 74 6F
E 0128 20 63 6F 6E 74 69 6E 75
E 0130 65 20 2E 20 2E 20 2E 0D
E 0138 0A 00 2E B9 1E 12 00 2E
E 0140 8C 06 14 00 CB 9C 50 56
E 014B 57 1E 55 0E 1F C4 3E 12
E 0150 00 26 B0 7D 02 00 75 12
E 015B EB 1C 00 26 C6 45 0D 00
E 0160 26 C7 45 0E 00 00 26 8C
E 016B 4D 10 26 C7 45 03 00 01
E 0170 5D 1F 5F 5E 58 9D CB BE
E 017B 16 00 FC AC 0B C0 74 06
E 01B0 B4 0E CD 10 EB F5 B4 00
E 01BB CD 16 C3
RCX
8B
W
Q
```

FIGURE 3: PAUSE CONFIG.SYS with the utility this file, PAUSE.SCR, creates.

The utility PAUSE.SYS lets you pause the display even if you don't have lightning reflexes. To pause the system at any point in your CONFIG.SYS file, insert the line **DRIVER=C:\PAUSE.SYS** in CONFIG.SYS where you'd like the system to pause. (If you put PAUSE.SYS somewhere else on your system rather than in the root directory of drive C:, be sure to modify this line appropriately.) The system will pause with the message 'Press any key to continue…'. Now you can pause CONFIG.SYS anywhere you want without missing important messages.

Ted Trost, Winnipeg, Manitoba, Canada

Editor's note: This clever driver, which duplicates a feature that comes with Novell's DR DOS, is a more flexible solution than the one we presented in the *Help Line* column. It's especially useful if your system uses the older IBM XT–style keyboard, which could pause output only with a finger-twisting two-key sequence (<Ctrl>-<Num Lock>). It's also handy if you want to

pause the system more than once during initialization—which requires dexterity even if you have a <Pause> key.

To create PAUSE.SYS, copy Figure 3 to a file called PAUSE.SCR. (If you're on PC World Online, you can download the file directly from our library.) Then type **DEBUG < PAUSE.SCR** at the DOS prompt. PAUSE.SYS will appear in the current directory.

Two caveats apply when you use this utility with a disk compression program such as *Stacker* or *SuperStor*. First, remember that the compressed drives on your system will not be accessible until the disk compression utility is loaded. You'll therefore want to put PAUSE.SYS on an *uncompressed* drive so you can pause CONFIG.SYS before the compression software becomes active. Also remember that compression utilities usually swap the hard drive letters at boot time to make the compressed drive look like drive C:. (The utility that does this is often called DEVSWAP or something similar.) If your system performs this drive letter swap, the correct path for PAUSE.SYS will differ depending on its position in the CONFIG.SYS file. In most cases, the uncompressed drive will be drive C: before the swap and drive D: (or higher) afterward. Both PAUSE.SYS and PAUSE.SCR are available in PC World Online's Featured in April folder.

Everything Must Go

It's amazing that MS-DOS still has no command for removing a directory that contains files or subdireetories. This simple *Turbo Pascal* program, DELSUB.EXE [Figure 4], solves the problem by removing any directory, along with its contents and subdirectories.

Alex Lloyd, Shaker Heights, Ohio

Editor's note: This program addresses a serious deficiency in DOS. To create DELSUB.EXE with *Turbo Pascal*, simply copy it to an ASCII text file called **DELSUB.PAS** and enter the command **TPC DELSUB** at the DOS prompt (assuming that *Turbo Pascal*'s BIN directory is in your PATH). This command will invoke the command-line version of the *Turbo* compiler and create the executable file in the current

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directory. Move DELSUB.EXE to a directory that's in your AUTOEXEC.BAT's PATH statement. To use the program, simply type **DELSUB** at the DOS prompt; the program will ask you for a directory to delete. Both DELSUB.PAS and DELSUB.EXE are available in PC World Online's Featured in April folder.

I've added some code that keeps the program from deleting everything in the root directory (it can't, of course, delete the root directory itself). One exception: If you've used the JOIN command to turn one drive into a virtual directory of another, and you tell DELSUB to erase that "directory," it will erase everything on the attached drive. In this situation, DOS—and DELSUB—won't recognize the root as a root.

Alex Lloyd's program is a good example of *recursion*—a technique in which a procedure calls itself repeatedly to accomplish the same task on several levels. In this case, the DELSUB's WIPESUB procedure is invoked afresh on each level of the directory tree to remove all the files at that level.

By Brett Glass

Brett Glass is a contributing editor for PC World.

Have a macro, batch file, short program, or general tip you're proud of? Mail your tips to Star-Dot-Star, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to PC World Online, Star-Dot-Star; Internet, rogue@well.sf.ca.us; MCI Mail, PC World Editorial; CompuServe, 74055,412; or 415/442-1891 (fax).* PC World *pays $25 to $200 for each tip used. Sorry, we cannot acknowledge unpublished materials.*

```
{$i-}
program Delsub;
uses dos;

var
  name:string;
  f:file;
  yn:string;

procedure wipesub(dir:string);
var
  sr:searchrec;
  f:file;
  namex:string;

begin
chdir(dir);
if ioresult <> 0 then
  begin
  writeln('Error changing to ',dir);
  halt;
  end;
findfirst('*.*',anyfile,sr);
while doserror = 0 do
  begin
  {Ignore pseudo-directories}
  if (sr.attr and directory <> 0)
     and (sr.name<>'..')
     and (sr.name<>'.') then
    begin
    namex:=sr.name;
    wipesub(sr.name);
    writeln('Removing ',namex);
    rmdir(namex);
    end;
  if sr.attr and directory = 0 then
    begin
    assign(f, sr.name);
    setfattr(f,$20);
    writeln('Removing file: ',sr.name);
    erase(f);
    end;
  if ioresult <> 0 then
    begin
    writeln('Unable to delete');
    halt
    end;
  findnext(sr);
  end;
  chdir('..');
end; {procedure wipesub}

begin
write('Name of directory to remove: ');
readln(name);
write('Are you sure? (Y/N): ');
readln(yn);
if upcase(yn[1])<> 'Y' then halt;
wipesub(name);
writeln('Removing ',name);
rmdir(name);
end.
```

FIGURE 4: REMOVE A DIRECTORY and its files and subdirectories with a Turbo Pascal program.

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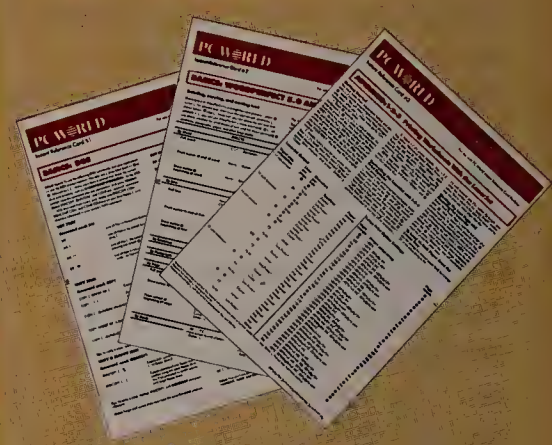

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NORTON DESKTOP FOR DOS 1.0

Norton Desktop for DOS can launch programs as well as manage drives, directories, and files. You invoke commands primarily via <Alt>– and <Ctrl>–*key* combinations and drop-down menus. Drive icons line the upper left side of the display by default. At the bottom is the Button Bar. To invoke a Button Bar command, double-click it or press its function key.

Note: Keys to press are shown here in **boldface**. Keys to press simultaneously are joined by a hyphen. A bullet (•) links menu, option, and button selections in a series. Commands begin at the desktop unless otherwise noted, and we assume that you're using the long pulldown menus.

MANAGING THE DESKTOP

Open help index	**H**elp • **I**ndex; **<F1>**; or click Help button on Button Bar
Get context-sensitive help	Select item, **<F1>**
Open drive window	Double-click drive icon; or **<Ctrl>–W** or **W**indow • Open Drive **W**indow, type drive letter, **O**K
Open menu window	**<F2>** or Menu button
Launch program or open submenu	Double-click its name; or highlight its name, **<Enter>**

Fold Here

Select window	Click window; or hold down **<Ctrl>**, **<Tab>** or **<F6>** until highlighted
Close selected window	**<Esc>C**lose or **<Ctrl>–<F4>**
Close all windows	**W**indow • Close **A**ll
Hide/unhide all windows	**W**indow • **H**ide All/Un**H**ide
Move selected window	Drag window title; or **<Esc>M**ove, cursor to new location, **<Enter>**
Enlarge selected window to full size	Click ▲ in upper right corner or **<Esc>**Maximize
Restore selected window to previous size	Click ▼ in upper right corner or **<Esc>R**estore
Resize selected window	Drag ↔, ↕, or ✥ in lower right corner; or **<Esc>S**ize, cursor to size, **<Enter>**
Cascade windows	**<Shift>–<F5>** or **W**indow • **C**ascade
Tile windows	**<Shift>–<F4>** or **W**indow • **T**ile
Refresh desktop	**V**iew • **R**efresh
Shell to DOS	**<Ctrl>–D** or **T**ools • D**O**S Session
Return from shell	**EXIT<Enter>** at DOS prompt
Show/hide DOS background	**<Ctrl>–O** or **V**iew • DOS **B**ackground
Quit *NDD*	**<Alt>–<F4>**; double-click ▣ or ▬ in desktop's upper left corner; or **F**ile • Exit. Exit

CUSTOMIZING THE DESKTOP

Begin each of these commands by opening the Configure menu with **<Alt>C**, **/C**, or **<F10>C**.

Select drive icons to display	**P**references • **D**rives, select drives, **O**K • **O**K
Select drive icons' location	**P**references, select location, **O**K
Add command to pulldown menu	**E**dit Pull-downs, highlight menu, highlight available command, **A**dd • **O**K

CUSTOMIZING THE DESKTOP (continued)

Show/hide Button Bar	**B**utton Bar, check/uncheck **D**isplay Button Bar box, **O**K
Change Button Bar commands	**B**utton Bar, highlight available command, select button, **A**ssign • **O**K
Choose which operations request confirmation	**C**onfirmation, check/uncheck operations, **O**K
Set clock	Clo**c**k, set parameters, **O**K
Set screen and mouse options	**V**ideo/Mouse, select options, **O**K
Set default editor	**E**ditor. Bu**i**lt In; or E**x**ternal, type path to editor. **O**K
Configure screen saver	**S**creen Saver, select options, **O**K
Set network type	**C**onfigure • **N**etwork, select network, **O**K
Set compression options	Com**p**ression, select options, **O**K
Set default printer settings	P**r**inter, select printer, **S**elect • Cl**o**se
Select long/short/WP 5.1 pulldown menu	**L**oad Pull-downs, select menu, **O**K
Password-protect 'Load Pull-downs' and 'Edit Pull-downs' commands	**P**assword, type password, **O**K, confirm password, **O**K
Save desktop configuration	Save Configuration

Fold Here

MANAGING DRIVES

Drive windows open to a default two-pane display. The Tree pane shows a directory tree, and the File pane lists the files and directories of the Tree pane's selected directory. The optional View pane appears beneath the File and Tree panes and shows a highlighted file's contents. (Open or select a drive window to use the View commands.)

Show/hide Tree pane	**V**iew • **T**ree Pane
Show/hide File pane	**V**iew • **F**ile Pane
Show all drive's files or Tree/File pane(s)	**V**iew • Show **E**ntire Drive
Show/hide View pane	**V**iew • **V**iew Pane
Show/hide file details (size, date, and so on)	**V**iew • File **D**etails, select details, **O**K
Filter files	**V**iew • Fi**l**ter, select file type and attributes, **O**K
Move between panes in selected drive window	**<Tab>**
Format disk	**D**isk • **F**ormat diskette. Select drive letter, size, and format type. **F**ormat
Unformat disk	**F**ile • **R**un • **B**rowse, select UNFORMAT.EXE, select drive, **O**K
Copy disk	**D**isk • **C**opy diskette, select source drive, select target drive, **O**K
Label disk	**D**isk • **L**abel Disk, type label, select drive, **O**K
Make bootable disk	**D**isk • **M**ake Disk Bootable, select drive, **O**K
Connect network drive	**W**indow • **O**pen Window • **N**etwork Link • **C**onnect, select file server, **O**K

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MANAGING DIRECTORIES

Select directory in Tree pane	Click directory; or highlight directory, **<Insert>**
Select/deselect adjacent directory(ies)	Right-click first directory, drag to last directory; or highlight directory, **<Insert>** repeatedly
Create directory	Highlight parent directory in Tree pane, **File** • Make Directory, type name, **OK**
Delete highlighted directory or selected directory(ies)	Drag directory to Delete button; or **<F9>** or **File** • **Delete**, **OK**, **Yes** or Yes to **All**
Rename highlighted directory	**File** • **Rename**, type name, **OK**
Move highlighted directory and its subdirectories	**Disk** • **Prune** & Graft, cursor under parent directory, **<Enter>**
Copy highlighted directory or selected directory(ies)	Drag directory to new parent; or **<F8>** or **File** • **Copy**, **Select**, highlight drive and parent, **OK**

MANAGING FILES

Select/deselect file	Right-click file; or highlight file, **<Insert>**
Select adjacent files	Right-click first file, drag to last file; or **<Insert>** repeatedly
Select/deselect all files in active drive window	**<Ctrl>–<Slash>**/**<Ctrl>–<Backslash>**; or **File** • **Select**/Deselect • **All**
Select/deselect file(s) by extension	**<Gray Plus>**/**<Gray Minus>**; or **File** • **Select**/Deselect • **Some**. Type extension, **OK**
Associate file with program	**File** • **Associate**, select program name, **OK**
Copy highlighted file or selected file(s) to default or specified directory	Drag file(s) to drive icon, **OK**. *Or* drag file(s) to Copy button or **<F8>** or **File** • **Copy**, **Select**, highlight drive and parent directory, **OK**
Delete selected file(s)	Drag file(s) to Delete button, **<F9>** or **File** • **Delete**; **OK**; **Yes** or Yes to **All**
Undelete file(s)	**Tools** • **UnErase**, select file(s), **UnErase**
Edit highlighted text file	Drag file to Edit button; double-click Edit button; **<F9>**; or **File** • **Edit**
Find file	Double-click Find button, **<F5>**, or **File** • **Find**; select file type and search location; **Find**
Move highlighted file or selected file(s) to default or specified directory	Drag file(s), hold down **<Alt>**, drop on drive icon, **OK**. *Or* drag file(s) to Move button or **<F7>** or **File** • **Move**, **Select**, highlight drive and parent directory, **OK**
Print highlighted file or selected file(s)	Drag file to Print button, double-click Print button; **<F6>**; or **File** • **Print**
Rename highlighted file or selected file(s)	**File** • **Rename**, type new name, **OK**
Launch highlighted file in associated application	Double-click file; or **<Ctrl>–R** or **File** • **Run**, **OK**
Archive highlighted file or selected file(s) into compressed file	**File** • **Compress**, type name, **OK**
Decompress archived file(s)	**Window** • **Open Window** • **Compressed File**, type ZIP file name or **Browse**, **OK**, select file(s), drag to drive window, **OK**

MANAGING FILES (continued)

Sort File pane's files	**View** • **Sort By**, select category or order
View highlighted file	Drag file to View button; double-click View button; **<F3>**; or **Viewer** • **File**

USING NORTON MENU

Use these Norton Menu commands to create and modify menus for launching applications. Select **Tools** • **Edit Menu** from the Desktop or enter **NMENU** at the DOS prompt to launch Norton Menu.

Autobuild/update menu	**File** • **Autobuild**, **Autobuild**/**Update**, **OK**
Create menu	**<Ctrl>–N** or **File** • **New**, type menu title, **OK**
Open menu	**<Ctrl>–O** or **File** • **Open**, select menu, **OK**
Select open menu	**<Ctrl>–<Tab>** or **<Ctrl>–<F6>** until highlighted
Close selected menu	**<Ctrl>–<F4>**; **<Ctrl>–W**; or **<Esc>Close**
Cascade menus	**Window** • **Cascade Menus**
Get info on selected menu	**<Alt>–I** or **Options** • Menu **Information**
Rename selected menu	**<Ctrl>–T** or **Edit** • **Menu Title**, type title, **OK**
Add item to selected menu	**<Ctrl>–A** or **Edit** • **Add**, select type, type name, type command line or **Browse**, type startup directory, **OK**
Save selected menu	**<Ctrl>–S**; or **File** • **Save**
Delete selected menu item	**<Delete>** or **Edit** • Clear, **OK**
Rename selected menu item	**<Ctrl>–E** or **Edit** • **Modify**, type name, **OK**
Move selected menu item	**<Ctrl>–X** or **Edit** • **Cut**, select new menu, **<Ctrl>–V** or **Edit** • **Paste**
Exit Norton Menu	**<Alt>–X**; or **File** • **Exit**

USING TOOLS

These tools are available from the Tools menu.

Scan for viruses	Norton Anti**Virus**
Perform backup	Norton **Backup**
Diagnose/repair disk	Norton **Disk** Doctor
Send MCI Mail message	Mail
Send network message	**Network** Message
Open calculator	**Calculator**
Open calendar	Calendar
Schedule *NDD* event or reminder	Scheduler
Optimize disk	**Speed** disk
Get system information	System Information

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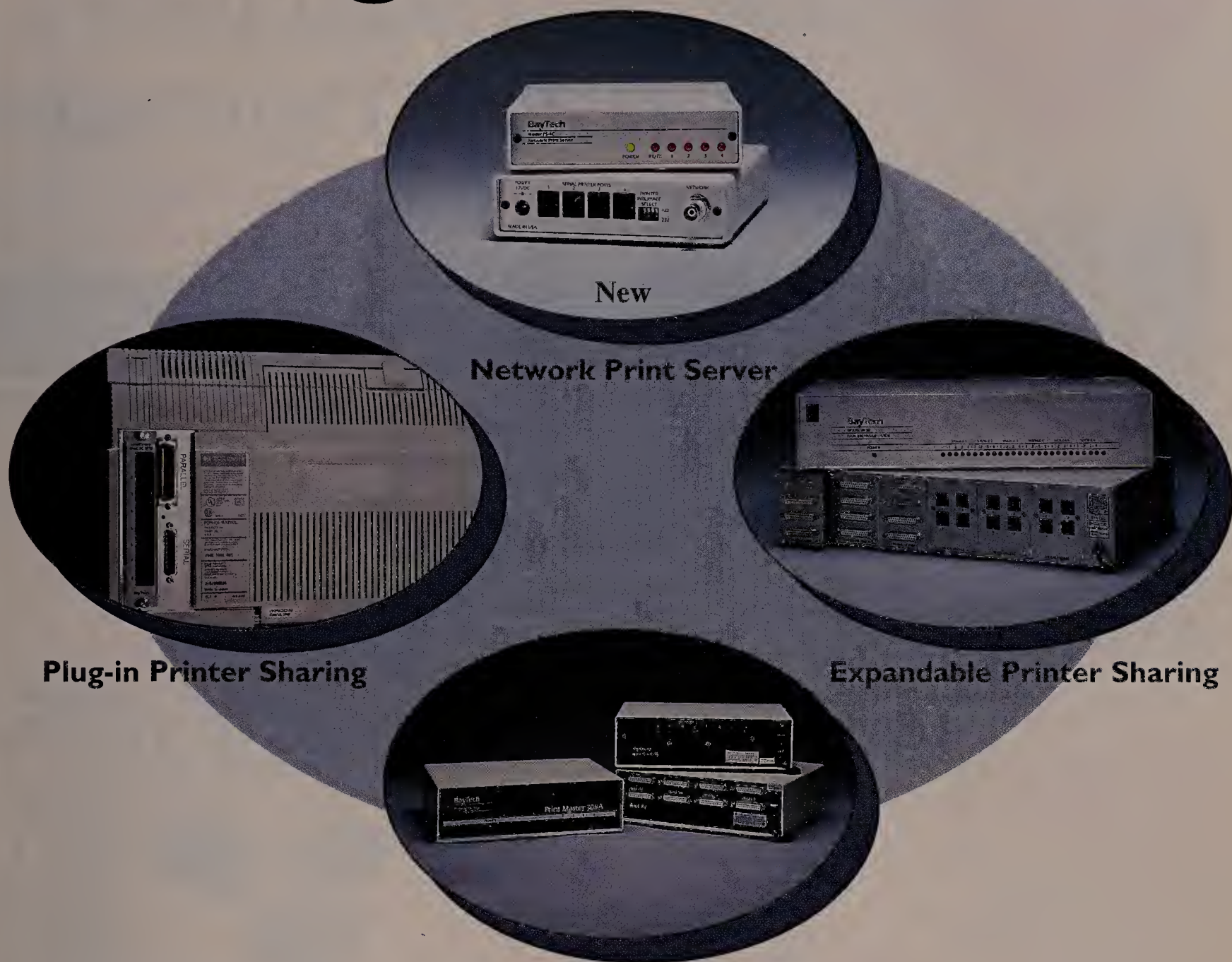

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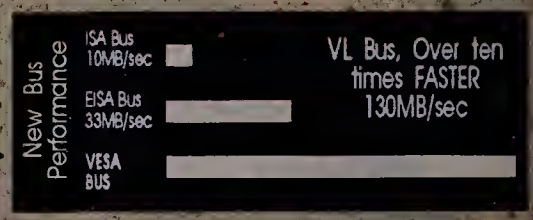

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FAX SURVEY

Win a Fax-Modem

Fax in your opinions to enter a drawing for a fax-modem.

Which articles in *PC World* are valuable to you? Which aren't? Help us improve the magazine by filling out the questionnaire below. Fax in your response and you'll have a chance to win a Megahertz pocket fax-modem featured in this month's buyers' guide.

HOW TO ENTER: Fax your completed questionnaire, along with your name and phone number, to *PC World* at 415/267-1779. If you have trouble connecting to this number, fax your survey to 415/974-7445 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 4–PCW, *PC World*, 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than April 30; we'll notify the winner by mid-May.

HOW TO FILL OUT THE FORM: FOR BEST RESULTS, PHOTOCOPY THIS PAGE; DO NOT TEAR IT OUT. Using black pen, clearly print your name (use block capital letters) and phone number at right; fill the appropriate circle under each digit of your phone number. Below, fill the circles under the answers that apply to each article you read. First tell us whether you read the entire article or just some of it. If you didn't read it at all, leave the line blank. If you read the article, please rate its value to you on a scale from 1 (least valuable) to 5 (most valuable). WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person.

First name

Last name

Daytime phone number

1	○	○	○		○	○	○		○	○	○	○
2	○	○	○		○	○	○		○	○	○	○
3	○	○	○		○	○	○		○	○	○	○
4	○	○	○		○	○	○		○	○	○	○
5	○	○	○		○	○	○		○	○	○	○
6	○	○	○		○	○	○		○	○	○	○
7	○	○	○		○	○	○		○	○	○	○
8	○	○	○		○	○	○		○	○	○	○
9	○	○	○		○	○	○		○	○	○	○
0	○	○	○		○	○	○		○	○	○	○

	Did you read it?		Value to you?				
			Least				Most
	All	Some	1	2	3	4	5
Sample	◉	○	○	○	○	○	◉
In This Issue (page 13)	○	○	○	○	○	○	○
Letters (page 17)	○	○	○	○	○	○	○
Consumer Watch (page 25)	○	○	○	○	○	○	○
Real Problems, Real Solutions (page 35)	○	○	○	○	○	○	○
Top of the News (pages 40–54)	○	○	○	○	○	○	○
OS/2 2.1 (page 40)	○	○	○	○	○	○	○
Maximizing High-Speed Modems (page 43)	○	○	○	○	○	○	○
Pinnacle Delivers Room to Grow (page 44)	○	○	○	○	○	○	○
Laplink V (page 44)	○	○	○	○	○	○	○
Pinnacle's Document Manager (page 52)	○	○	○	○	○	○	○
Notes 3.0 (page 54)	○	○	○	○	○	○	○
New Products (page 63)	○	○	○	○	○	○	○
Marketplace (page 95)	○	○	○	○	○	○	○
Great Software Under $50 (page 100)	○	○	○	○	○	○	○
Windows Notebooks for $2000 or Less (page 114)	○	○	○	○	○	○	○
Local Bus: The Key to Faster PCs? (page 143)	○	○	○	○	○	○	○

	Did you read it?		Value to you?				
			Least				Most
	All	Some	1	2	3	4	5
Buyers' Guide: 200MB Hard Disks (page 150)	○	○	○	○	○	○	○
Faster, Cheaper Fax-Modems (page 162)	○	○	○	○	○	○	○
Draw Programs for the Rest of Us (page 175)	○	○	○	○	○	○	○
Help Line (page 188)	○	○	○	○	○	○	○
Spreadsheets (page 192)	○	○	○	○	○	○	○
Word Processing (page 198)	○	○	○	○	○	○	○
Windows (page 204)	○	○	○	○	○	○	○
Data Management (page 208)	○	○	○	○	○	○	○
Publishing & Presentations (page 212)	○	○	○	○	○	○	○
Communications (page 218)	○	○	○	○	○	○	○
Star-Dot-Star (page 219)	○	○	○	○	○	○	○
Norton Desktop for DOS (page 223)	○	○	○	○	○	○	○
Business Fixtures (page 257)	○	○	○	○	○	○	○
Break Time (page 261)	○	○	○	○	○	○	○
Home Office (page 266)	○	○	○	○	○	○	○
HOW WOULD YOU RATE THIS ISSUE OVERALL?			○	○	○	○	○

Are you or your company struggling with a PC problem? We want to help. Tell us what technology-related business problems you want us to examine in *Real Problems, Real Solutions; PC World Adviser;* or elsewhere in the magazine.

PLEASE FAX TO 415/267-1779

PC WORLD
CATALOG

Shop The PC World Catalog For Fast Solutions To Your PC Needs

The *PC World* Catalog is the most cost efficient way to bring your product message to managers proficient with PCs, the group identified by study after study as today's key buyers of computers and related equipment.

Your message can reach buyers in a variety of ways. The "Business Class" section brings your ad to our 901,000 readers with four-color impact. *PC World's* "Computer Showplace" section highlights your ad in black and white, with a choice of display or text/only formats (standard red can be added as a second color).

For complete information on Catalog advertising, please call toll-free 800-262-9885 or 203/838-1425 Fax. PC World Catalog, c/o RAM, 50 Washington Street, South Norwalk, CT 06854.

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Western Account Manager
203-857-5102

SALLY NAYLOR
Catalog Coordinator
203-857-5100

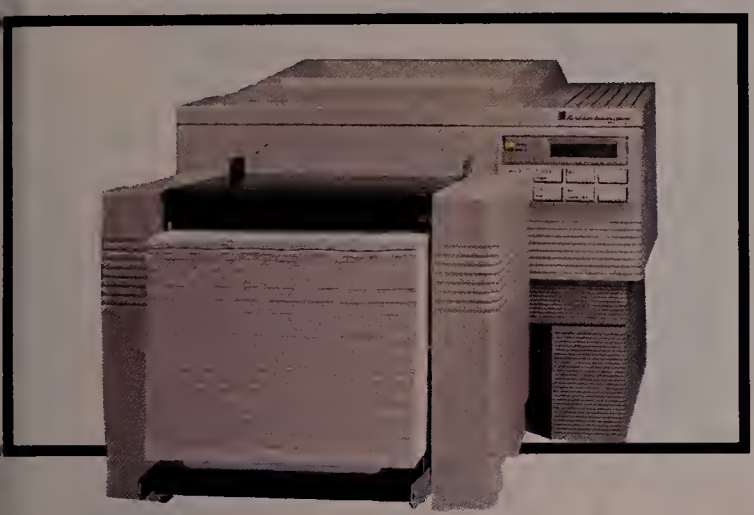
CHRIS KIMBALL
Eastern Account Manager
203-857-5101

Product Category	New Product	Business Class	Computer Showplace
HARDWARE			
Bios Chip			232
Communications		230	
Computer/Systems		230	232
Peripherals	229	230	232
Printer Accessories	229		
Upgrades			232
SOFTWARE			
Accounting			234
Business Applications			234
CD Rom			235
Church Applications			235
Data Entry			235
Educational			235
Financial			235
Flow Charting			236
FORTRAN			235
Graphics			236
Health			235
Inventory Control/Management			236
Mailing Programs			236
Mail Order			236
Maintenance Management			236

Product Category	New Product	Business Class	Computer Showplace
Medical			236
Music			236
Point of Sale			236
Public Domain/Shareware			236
Real Estate			237
Schools			237
Science		231	
Security			237
Statistics			237
Surveys			237
Utilities			237
MISCELLANEOUS			
Accessories		231	232
Bar Coding			232-233
Business Opportunities			232
Computer Insurance			233
Data/Disk Conversion			233
Disk Copy Service			234
Disks			233
Furniture		231	
On-Line Services		231	
Supplies			234
Shipping Cases		231	

NEW PRODUCT INTRODUCTIONS

material supplied by advertisers. For advertising information, contact PC World Catalog Sales Group at 1-800-262-9885



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The Paper Server™ is an affordable, high capacity paper feeder that substantially increases the paper capacity of most laser printers. It holds 1500 sheets of paper and fits into the existing paper tray slot of the printer. So now you can print and print and print...without having to refill paper. This means fewer interruptions and increased productivity. The Paper Server installs in minutes and needs no software or cables. The electronically controlled platform insures proper paper positioning and jam-free operation. Take advantage of our introductory 30 day money back guarantee and order now.

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CIRCLE 447 ON READER SERVICE CARD

VOCALTEC

The VOCALTEC CAT is the best external audio device for PC platform. Installed easily to the parallel port it allows you highest quality audio recording and playback at very low storage rate. The CAT is the lightest (2 oz.) smallest external audio device.

CAT has microphone and speakers connectors, Telephone handset connector, AC adaptor (included) and a 9V battery compartment.

"The Vocaltec product has a higher sound quality". – Computerworld

At $179 the CAT is supplied with Windows 3.1 and DOS install programs; windows driver, quality recorder, volume control, Lotus sound, DOS play, record, SBtools (Audio editor).

CAT supports extensive list of standard software programs.

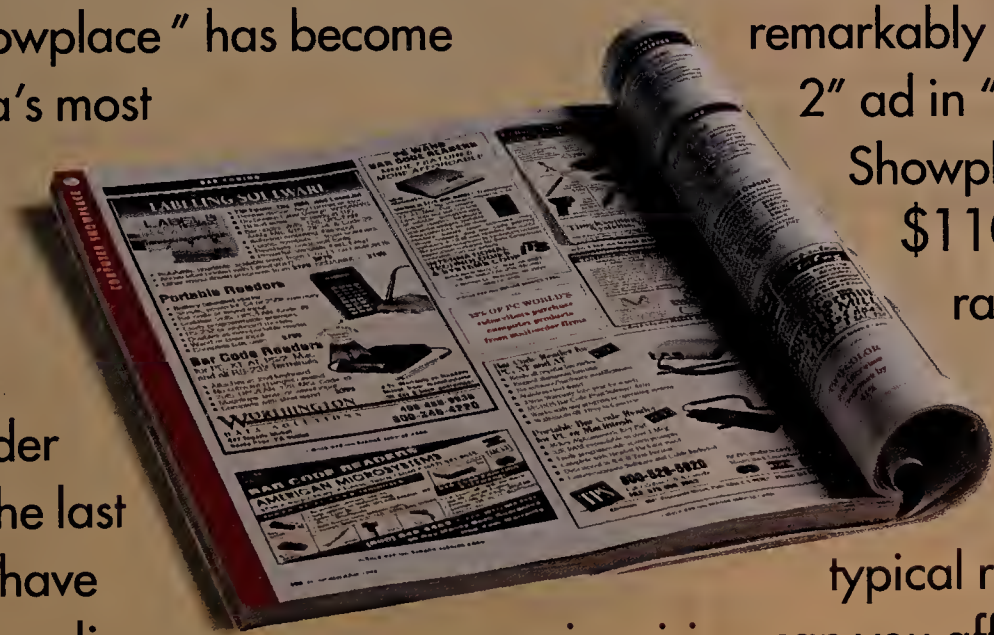
Free Programmers Tool kit.

For Information **CALL 1-800-THE-CAT9 (1-800-843-2289)**

CIRCLE 449 ON READER SERVICE CARD

How to Make Your Product Leap Off the Shelf

t's no secret anymore. *PC World's* "Computer Showplace" has become one of America's most successful selling platforms for hardware and software. Reader responses for the last twelve months have averaged 398 replies per ad, an increase of 43% over the prior year. And the price is remarkably affordable. A 2" ad in "Computer Showplace" costs about $1100 at the 12 time rate. So figure it out -- if your ad just pulls the typical response of 398 inquiries, can you afford NOT to advertise in *PC World?*



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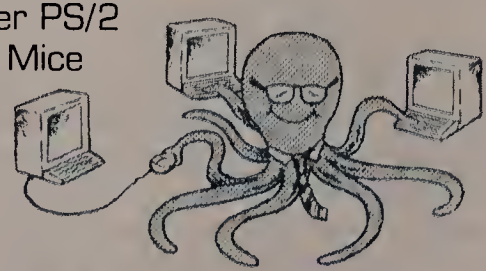

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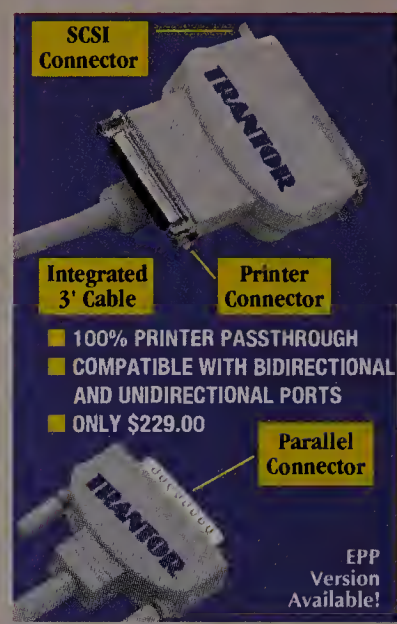

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"This product...is darned near perfect."
–Jerry Pournelle, Byte Mag. March 1993

"...even more elegant than its predecessor and almost twice as fast."
–Jim Seymour, PC Mag. December 1992

CIRCLE 469 DN READER SERVICE CARD

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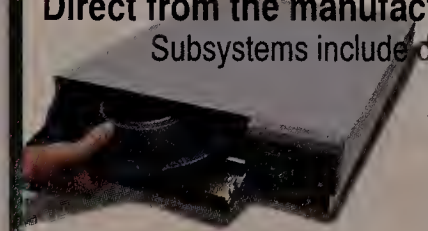
Direct from the manufacturer. 1600 & 6250 bpi.
Subsystems include drives and software.



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Since 1980

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Ask about 3480 tape drives too

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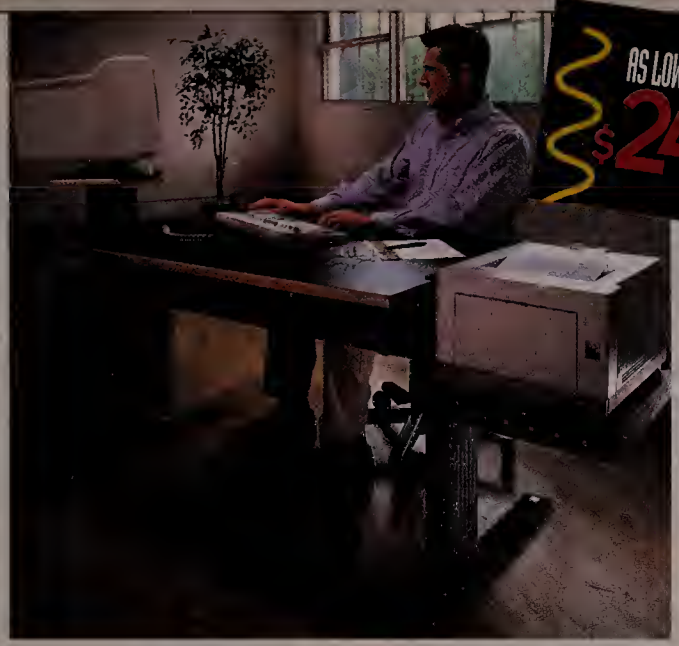
PC World's Business Class section brings your four-color ad to over 900,000 of North America's most influential PC buyers at very economical rates.

Call now for more information 800/262-9885



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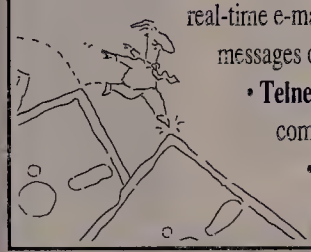

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CIRCLE 432 ON READER SERVICE CARD

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Transfer files from one PC to another PC with this low cost utility.

$24.95

Kit includes: TWCOPY software in 5 1/4 and 3 1/2 format, a special parallel port cable and instuctions.

For DOS systems

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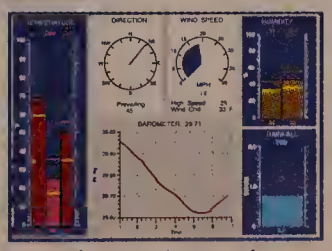

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CIRCLE 488 ON READER SERVICE CARD

FACT: *56% of PC WORLD subscribers reported making purchases "immediately" or "very soon" after seeing an ad in the magazine.*

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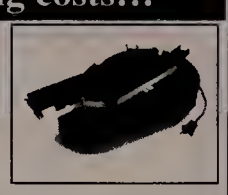

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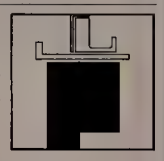
Jet-Master™



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CIRCLE 483 ON READER SERVICE CARD

FACT: 61% of PC WORLD subscribers purchased software from mail order firms.

Miscellaneous

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CIRCLE 508 ON READER SERVICE CARD

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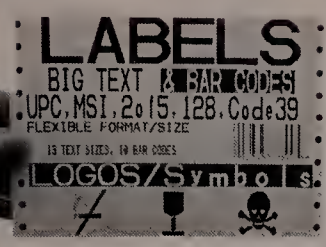

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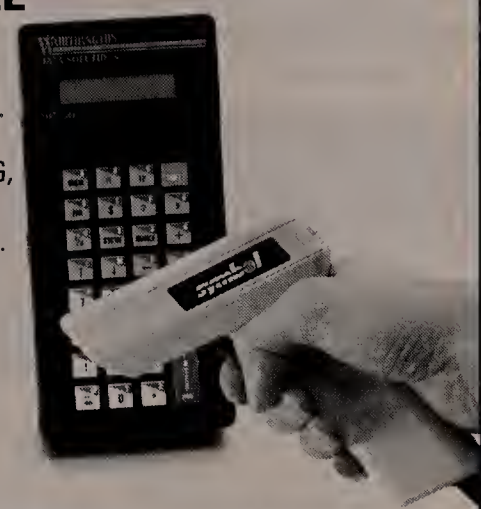

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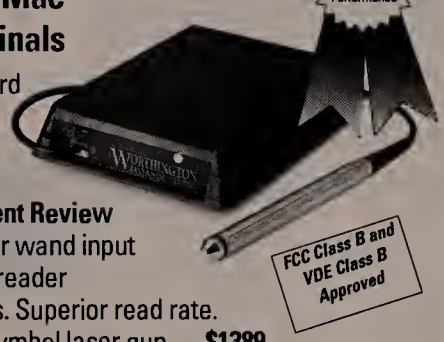

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Advertiser Index A-Z

Get more information—circle the appropriate number on the reader service card.

Reader Service Number		Page Number
54	Acer	202-203
66	Acma Computers, Inc.	226
9	Advanced Logic Research	87
207	America Online	215
45	American Power Conversion	34
1	American Small Business Computers	94
–	Anthro Corp.	36
8	Arlington Computer Products	243
–	AST Research	20-21
38	Bay Technical Associates	225
41	Bitstream	38-39
31	Bitwise	18
44	Borland International	53
13	Borland International	69
17	Caere Corp.	142
50	Canon	166-167
64	Canon	201
–	Canon	213
52	Central Point Software	128-129
19	CompuAdd	92-93
14	CompuDyne	197A-197B
33	CompuServe	19
29	Computer Associates	26
–	Computer Bowl	218A
68	Computer Discount Warehouse	247-249
92	Corel Systems Corp.	186
87	CoStar	22
56	Cougar Mountain Software	90
–	Curtis	91
–	Dell Computer Corp.	70-71, 148-149, C5-C8
–	Epson	84-85
235	Fifth Generation	12
73	First Source International	197D
–	Gateway 2000	55-62, 79-82
79	Haventree Software Ltd.	193
90	Helix Software	23
114	Hewlett Packard	205
142	IBM Direct	133-136
121	Insight Software	216-217
131	Insight Software	244-245
115	Intel Corp.	96-97
–	Intuit	256
152	Iomega	172-173
–	LA Trade	246
137	LaserMaster	124
206	LearnKey, Inc	250-251
122	Logitech	30
–	Lotus	14-15, 27,29,31,32-33
–	Lotus	121-123, 180-181
149	Maynard Electronics	99
197	MEI/Micro Center	47
217	Merritt Computer Products	264
183	Micrografx	130A
128	Micrografx	197C
–	Microsoft	50-51, 131A-131B
–	Microsoft	160-161, 197
166	Microsoft Press	65
200	MieroSolutions	258
157	MieroTac Software	259
172	MIS Computer Systems	253
143	Mousetrak	49
178	National Videotex	199
187	NEC Technologies	C2-P1
203	NEC Technologies	184-185
201	NEC Technologies	195
–	Northgate Computer Systems	24A-24F
–	NRI Schools	187
–	Pacific Data Products	67
233	Patton & Patton	260
–	PC Connection	218B-218I
207	PC World Online	215
234	PC World Video	211
210	Pixar	89
212	PKWare	221

Index

Reader Service Number		Page Number
144	Polaris Software	16
177	Presentation Task Force	174
198	Protec Microsystems	206
239	Rose Electronics	147
150	S Software	262
191	Sierra On-Line	130B
245	Sierra On-Line	265
–	Software Publishing	154-155
209	Strategic Mapping	214
249	Supra Corp.	98
252	Symantec	209
124	Tektronix, Inc.	77
242	Texas Instruments	37
220	Texas Instruments	112-113
244	Texas Instruments	191
257	Toshiba	74-75
148	USA Flex	254-255
216	V-Com	252
224	Valitek	78
243	Ventura Software	207
250	Western Telematic	24
–	WordPerfect	9-11, 263
237	XTree	28
240	Zenith Data Systems	106-107
258	Zeos International	4-5
260	Zeos International	6-7

Advertiser Index by Product Category

Get more information—circle the appropriate number on the reader service card.

HARDWARE

Boards/Cards/Chips

115	Intel Corp.	96-97
152	Iomega	172-173

Communications

249	Supra Corp.	98

Computers

54	Acer	202-203
66	Acma Computers, Inc.	226
9	Advanced Logic Research	87
–	AST Research	20-21
19	CompuAdd	92-93
14	CompuDyne	197A-197B
–	Dell Computer Corp.	148-149, C5-C8
–	Gateway 2000	55-62, 79-82
142	IBM Direct	133-136
121	Insight Software	216-217
131	Insight Software	244-245
172	MIS Computer Systems	253
203	NEC Technologies	184-185
–	Northgate Computer Systems	24A-24F
220	Texas Instruments	112-113
244	Texas Instruments	191
148	USA Flex	254-255
216	V-Com	252
240	Zenith Data Systems	106-107
258	Zeos International	4-5

Input Devices

122	Logitech	30
143	Mousetrak	49

Laptop/Notebooks

31	Bitwise	18
14	CompuDyne	197A-197B
–	Dell Computer Corp.	70-71
–	Gateway 2000	79-82
197	MEI/Micro Center	47
–	Northgate Computer Systems	24A-24F
244	Texas Instruments	191
257	Toshiba	74-75
240	Zenith Data Systems	106-107
260	Zeos International	6-7

Local Area Networks

239	Rose Electronics	147
250	Western Telematic	24

Multimedia

187	NEC Technologies	C2-P1
216	V-Com	252

Other

198	Protec Microsystems	206

Peripheral/Sharing Devices

152	Iomega	172-173
239	Rose Electronics	147
250	Western Telematic	24

Power Protection

45	American Power Conversion	34
–	Curtis	91

Printers/Plotters

38	Bay Technical Associates	225
50	Canon	166-167
64	Canon	201
–	Canon	213
87	CoStar	22
–	Epson	84-85
137	LaserMaster	124
201	NEC Technologies	195
–	Pacific Data Products	67
198	Protec Microsystems	206
124	Tektronix, Inc.	77
242	Texas Instruments	37

Scanners

64	Canon	201

Storage Devices

149	Maynard Electronics	99
200	MicroSolutions	258
224	Valitek	78

SOFTWARE

Accounting/Financial

29	Computer Associates	26
56	Cougar Mountain Software	90
–	Intuit	256

CAD/CAM

1	American Small Business Computers	94

Database Management

44	Borland International	53
–	Microsoft	160-161

Desktop Mapping

209	Strategic Mapping	214

Desktop Publishing

243	Ventura Software	207

Entertainment

191	Sierra On-Line	130B
245	Sierra On-Line	265

Fontware

41	Bitstream	38-39

Graphics

1	American Small Business Computers	94
17	Caere Corp.	142
92	Corel Systems Corp.	186
183	Micrografx	130A
128	Micrografx	197C
177	Presentation Task Force	174
–	Software Publishing	154-155

Integrated Software

–	Microsoft	131A-131B

Management

90	Helix Software	23

Presentation Graphics

–	Lotus	14-15
–	WordPerfect	9-11

Project Management

79	Haventree Software Ltd.	193
–	Microsoft	197
233	Patton & Patton	260
144	Polaris Software	16

Shareware

150	S Software	262

Spreadsheets/Templates

13	Borland International	69
–	Lotus	27,29,31,32-33,180-181
–	Microsoft	50-51

Utilities

52	Central Point Software	128-129
235	Fifth Generation	12
114	Hewlett Packard	205
212	PKWARE	221
237	XTree	28

Windows

17	Caere Corp.	142
92	Corel Systems Corp.	186
114	Hewlett Packard	205
183	Micrografx	130A
128	Micrografx	197C
210	Pixar	89
177	Presentation Task Force	174
–	Software Publishing	154-155
209	Strategic Mapping	214
252	Symantec	209
–	WordPerfect	263
237	XTree	28

Word Processing

–	Lotus	121-123
157	MicroTac Software	259

MISCELLANEOUS

Books/Periodicals

166	Microsoft Press	65

Computer Accessories

–	Anthro Corp.	36
217	Memitt Computer Products	264

Mail Order

8	Arlington Computer Products	243
68	Computer Discount Warehouse	247-249
73	First Source International	197D
121	Insight Software	216-217
131	Insight Software	244-245
–	LA Trade	246
172	MIS Computer Systems	253
–	PC Connection	218B-218I
148	USA Flex	254-255

Online Services

207	America Online	215
33	CompuServe	19
178	National Videotex	199
207	PC World Online	215

Other

234	PC World Video	211

Trade Shows

–	Computer Bowl	218A

Training

206	LearnKey, Inc	250-251
–	NRI Schools	187

Products Featured in Editorial

Get more information—circle the appropriate number on the reader service card.

Add-On Board

771	Adaptec SCSI Host Adapter, Adaptec	68
664	One Slot, Star Gate Technologies	266

Antivirus Software

634	Win Rx 1.0, Trend Micro Devices	111

Backup Software

632	MyAdvancedBackUp for Windows 1.01, MySoftware	111

Book

691	The Encyclopedia of Main Boards, Micro House	88

Business Application

797	Forecast Pro 2.0 for DOS, Business Forecast Systems	52

CAD/CAM

779	AutoCAD Release 12 for Windows, AutoDesk	78

Communications

605	BitCom for Windows 1.04a, Bit Software	102
696	BitFax 4.0 for DOS, Bit Software	88
606	BitFax for Windows 2.05, Bit Software	102
697	Commence 1.01, Jensen-Jones	90
665	CO/Session 6.1, Triton Technologies	266
607	Easydial 4.4, Patri-Soft	102
695	FaxGrabber 1.2, Calera Recognition Systems	88
780	Here & There, Fifth Generation Systems	83
608	Lync 3.0, Jason R. Alward	102
714	WinFax Pro 3.0, Delrina Technology	257

Communications Utility

662	LapLink Pro, Traveling Software	266
801	LapLink V, Traveling Software	44

Computer System

667	AcerAnyWare V386SL, Acer America	118
668	Arche NP-201, Arche Technologies	119
669	Aspen Aquiline Personal 486, Aspen Computer	120
670	Austin 386/SXL-25, Austin Computer Systems	120
671	BCC SL325, Beaver Computer Corp.	120
672	Blackship BLK 386SL/25 NB, Blackship Computer Systems	126
673	CAF AquaLite-II, CAF Technology	126
674	Chaplet NBC 386SL-25, Chaplet Systems USA	126
675	Compaq Contura 3/25 Model 84/w+, Compaq Computer	127
676	Compudyne Slimline 386SL/25, Compudyne	130
677	Compudyne Slimline 386SXL/25, Compudyne	130
678	CompuTrend Premio SL Notebook, CompuTrend Systems	130
679	Cube 325NTX Model 80, Cube Computer Corp.	131
680	Darius Professional Plus, Darius Technology	131
769	Dauphin 550, Dauphin Technology	66
799	Dauphin DTR-1, Dauphin Technology	42
681	Dell Dimension NL25, Dell Computer	131
682	Micro Express NP925, Micro Express	132
765	NEC Image Series, NEC Technologies	63
683	Swan 386SX/25, Swan Technologies	132
684	Swan 486/SLC-25, Swan Technologies	138

Index

Reader Service Number — Page Number

685 Toshiba Satellite T1850, Toshiba America ... 138
686 ZDS 625nl Model 85, Zenith Data Systems ... 139

Database Management

609 MyDataBase, MySoftware ... 102
610 Zephyr 4.0, Ward Mundy Software ... 103

Desktop Publishing

657 dbPublisher Pro+ 3.1, Digital Composition Systems ... 208
658 InfoPublisher 1.2, PageAhead Software ... 208

Disk Drive

641 CMS Enhancements B240S5-N, CMS Enhancements ... 150
642 Conner Peripherals Cougar CP-30204, Conner Peripherals ... 150
643 Core Int'l 3SHC230, Core Int'l ... 150
644 Maxtor 7213A, Maxtor 7213S; Maxtor ... 150
645 Optima Technology DisKovery S 200I/AT, Optima Technology ... 150
646 Perisol Technology DataSafe 213S, Perisol Technology ... 150
647 Procom Technology ProPaq/s200x, Procom Technology ... 150
648 Quantum Hardcard EZ, Quantum ProDrive LPS 240AT, Quantum ProDrive LPS 240S; Quantum ... 150
649 Seagate Technology ST3283A, Seagate Technology ST3283N; Seagate Technology ... 150
650 Western Digital Caviar WDAC2200, Western Digital ... 150

Display

767 Sony CPD-1430, CPD-1730, GDM-2038 Multiscan Trinitron Monitors; Sony Corporation of America ... 64

DOS Shell

698 XTree for Windows 1.5, XTree Co. ... 73

Entertainment/Game

793 Battle Chess Enhanced CD ROM, Interplay Productions ... 261
795 Great Naval Battles: North Atlantic 1939-1943, Strategic Simulations ... 261
792 SimLife, Maxis ... 261
794 The Secret of Monkey Island, CD ROM Edition; LucasArts/LucasFilm Games/Software Toolworks ... 261

Fax-Modem

728 2400 ETC Fax, ATI Technologies ... 168
760 2496f, Hide Away Fax; Telenetics ... 170
727 9624SS-7, 9624PSS-7, 9614BAV; Archtek America ... 168
750 9696i, 1414i; Maxtron ... 170
724 AMT Star 2496, AMT Starcard 2400fx, AMT Starcard 2442fx; AMT International Industries ... 168
729 AT&T DataPort 9.6/FAX, AT&T Paradyne ... 168
736 The Complete Modem Plus, The Complete PC ... 168
720 DataFax 9624+, Hi-Per 14/14, Externally 14/14, Comm-panion 9696; Adtech Micro Systems ... 168
734 DeskFax Pro-Pak, Choice Technology Group Ltd. ... 168
741 Dovefax LE, Dove Computer ... 170
737 Dynalink 9624P, Computer Friends ... 168
755 Easymodem 24 Plus, Perfect Data ... 170
743 Everfax 24/96, Everex Systems ... 170
726 Fax 24 Angia Communications ... 168
754 Fax24I, PC Logic ... 170
740 FaxModem-300, DFI ... 168
745 Fax Pro IIC, Fax Pro ... 170
764 FCV+, AFC Internal/AFX, FaxModem VFP V.32bis; Zoom Telephonics ... 170
732 FM9624, Boca Research ... 168
747 FM9696/24V, FM9696/24, FMM9696/24V, FMM9696/24; GVC Technologies ... 170
746 Forval 2496, Forval America ... 170
749 Logicode 9624V, Logicode Technology ... 170
733 MB2296SR, MVP96IF, Cardinal Technologies ... 168
744 Model 765096, Extech Data Systems ... 170
725 Nicetalk NT 1414vi, Nicetalk NT 9624m, Nicetalk NT 9624vi, Nicetalk NT 9624vm; Andgate Systems ... 168
753 Omron Impala 24/96, Omron Office Automation Products ... 170
751 P224FMV, T324FM; Megahertz ... 170
721 PC Mate 9600/2400, Addtech Research ... 168
756 PM9600FX, PM2400EFX, PM2400FX96; Practical Peripherals ... 170
739 RediCard 2496, Data Race ... 168
748 SatisFAXtion Modem/100, Intel ... 170
723 SF-9624-PCM, SF-9624-PKM, SF-1496-SA; American Data Technology ... 168
752 SM Fax96, Mitsuba ... 170
731 Smart One 9624F, Smart One 9624FX, Smart One 2442F; Best Data Products ... 168
730 Spectra-Com FM9642, Spectra-Com FM1496P; Bay Connection ... 168
757 Spirit II, QuickComm Technologies ... 170
762 Sportster 14,400 Fax, Sportster 9600 Fax, Sportster 2400 Fax; U. S. Robotics ... 170
758 SupraFaxModem V.32, SupraFaxModem Plus; Supra ... 170
759 Swan 9600 S/R, Swan Technologies ... 170
761 TwinCom 24/96, TwinCom 14.4/DFI; TwinCom ... 170
742 UFOmate P9624MX, E-Tech Research ... 170
738 Viva 2442, Viva Data/Fax, Viva 2496ef, Viva 2496 Pocket; Computer Peripherals ... 168
735 X9648, CMS Enhancements ... 168
722 Xpress 42P, Xpress 144PC, Xpress 42MC, Xpress 42PC; Advanced Microcomputer Systems ... 168
763 Zoltrix 144/144e, Zoltrix Enhanced, Zoltrix Standard/Windows, Zoltrix Pocket 96/24; Zoltrix ... 170

Financial

618 Andrew Tobias' Managing Your Money 9.0, Meca Software ... 104
702 CA-Compete 5.0 for Windows, Computer Associates ... 88
701 Fidelity On-line Xpress 2.0 Fidelity Investments ... 88

Font

611 Adobe Type Set Value Pack, Adobe Systems ... 103
713 Typecase II, SWFTE ... 257

Graphics

621 Arts & Letters Sceneno, Computer Support Corp. ... 108
778 Fractal Design Painter 2.0, Fractal Design ... 76
651 Photo CD Access for Windows, Eastman Kodak ... 188
653 ToolBook for Windows, Asymetrix ... 189

Hardware Interface

772 Future Domain SCSIworks, Future Domain ... 68
777 Looking Glass HyperWrite 1.0, Looking Glass Software ... 76

Information Management

656 Crystal Reports 2.0, Crystal Services ... 208
712 Maximizer for Windows, Richmond Technologies & Software ... 257
659 Report Styler, Alpha Software ... 208

Input Device

694 PC Mouse 3D/6D, Mouse Systems ... 63

Integrated Software

635 Easy Working Eight-in-One and Easy Working for Windows Eight-in-One, Spinnaker Software ... 105
798 Lotus Notes 3.0, Lotus Development ... 54
699 PFS:First Choice 4.0, Spinnaker Software ... 88

LAN Application

781 Web for Windows 4.0, Webcorp ... 83

Legal

615 It's Legal 3.0, Parsons Technology ... 104

Mail Order

669 Aspen Aquiline Personal 486, Aspen Computer ... 120
670 Austin 386/SXL-25, Austin Computer Systems ... 120
672 Blackship BLK 386SL/25 NB, Blackship Computer Systems ... 126
676 Compudyne Slimline 386SL/25, Compudyne ... 130
677 Compudyne Slimline 386SXL/25, Compudyne ... 130
679 Cube 325NTX Model 80, Cube Computer Corp. ... 131
680 Darius Professional Plus, Darius Technology ... 131
681 Dell Dimension NL25, Dell Computer ... 131
682 Micro Express NP925, Micro Express ... 132
683 Swan 386SX/25, Swan Technologies ... 132
684 Swan 486/SLC-25, Swan Technologies ... 138

Miscellaneous

622 CardsNow, Topitzes & Associates ... 108
661 FileRunner 1.4, MBS Technologies ... 266
663 Parallel Port Multiplexer, Xircom ... 266
796 Pinnacle Paperless 1, Pinnacle Micro ... 52

Modem

782 MultiModemLAN, Multi-Tech Systems ... 86
783 NetModem/E for Windows for Workgroups, Shiva Corp. ... 86
700 Optima Pocket Edition/PCMCIA, Hayes Microcomputer Products ... 90

Multimedia

626 MediaClips, Aris Entertainment ... 109

Optical Storage

711 Cachet System, Maximum Storage, Inc. ... 257
768 Iomega Floptical Drive, Iomega ... 66
800 Pinnacle PMO-130, Pinnacle Micro ... 44

Personal Information Manager

619 Any Time, Individual Software ... 105
616 Nolo's Personal RecordKeeper 3.0, Nolo Press ... 104
620 Time & Chaos 3.05, iSBiSTER Int'l ... 108

Presentation Graphics

710 ABC FlowCharter 2.0, Micrografx ... 257
784 Arts & Letters Apprentice 1.11, Computer Support ... 177
636 Easy Working Presentation Maker, Spinnaker Software ... 105
785 Harvard Draw 1.01 for Windows, Software Publishing ... 178
786 Instant Artist 1.0 for Windows, Autodesk Retail Products ... 178
787 IntelliDraw 1.0, Aldus ... 179
788 KeyDraw Plus 3.0 for Windows, SoftKey Software Products ... 179
625 Lecture for Windows 1.02, Barn Owl Software ... 109
624 Print Shop Deluxe, Broderbund Software ... 109
623 Paint Shop Pro 1.02, JASC ... 108
790 Visio 1.0 Shapeware ... 182
789 Windows Draw 3.0 Plus OLE, Micrografx ... 182

Printer

766 HL-10PS, Brother Int'l ... 64

Project Management

703 CA-SuperProject 3.0 for Windows, Computer Associates ... 90

Scanner

770 Leoscan 610, Leoscan 1210; FICUS Systems ... 68

Spreadsheet

773 1-2-3 Release 3.4, Lotus Development ... 73
627 Alite 1.1, Trius ... 109
637 Easy Working Spreadsheet, Spinnaker Software ... 105

Tax

617 Andrew Tobias' TaxCut, Meca Software ... 104

User Group

601 Atlanta PC Users Group, Jack Bolton ... 189

Utility

628 Boxer 4.0c, Boxer Software ... 109
775 CheckIt Pro, TouchStone Software ... 72
652 ConvertIt for Windows, Heizer Software ... 189
654 Disk Manager Ontrack Computer Systems, ... 190
630 Disk Optimizer Tools 4.05, SoftLogic Solutions ... 110
666 Doc-To-Help 1.1, WexTech Systems ... 196
613 DOS Help 5.0, Flambeaux Software ... 103
631 hDC Power Toolboxes 1.0, hDC Computer ... 111
629 Mega Edit 2.07, Computer Witchcraft ... 110
633 Metz Task Manager 2.0, Metz Software ... 111
655 The Norton Utilities 6.01, Symantec ... 190
614 Professor DOS, Individual Software ... 103
774 QAPlus 4.7, DiagSoft ... 72
776 WinMaster 1.5, PC-Kwik ... 72

Word Processing

638 Easy Working Word Processor and Easy Working Desktop Publisher, Spinnaker Software ... 105

Word Processing Utility

612 PC-Proof 1.5, Intellect Systems ... 103
690 Word for Word for Windows, Mastersoft ... 88

FREE PRODUCT INFORMATION PC WORLD

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

PHONE ( ) FAX ( )

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
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4/93

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959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

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21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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Premium 386/33	1Meg	500718-002	56.00
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386SX20, 486-25, 25E, 33	4Meg	500780-004 WPB	149.00
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MODEL#	AMT. UPGRADED	ZENITH PART#	PRICE
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T2000SX/T1000LE	8Meg	PC14-PA8315U	269.00
T2000SXE/2200SX/T1800, 1850, C	2Meg	PC-PA2000U	75.00
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T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	269.00
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T4400SX, SXC T6400	4Meg	PC-PA2004U	169.00
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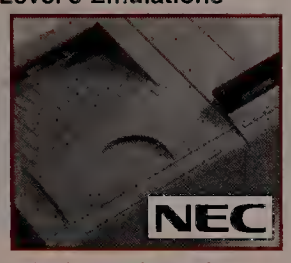

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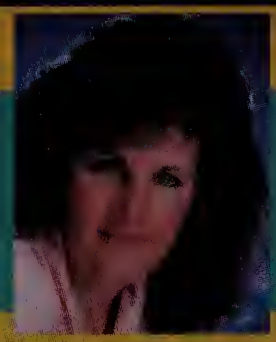

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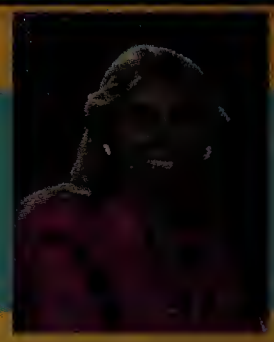

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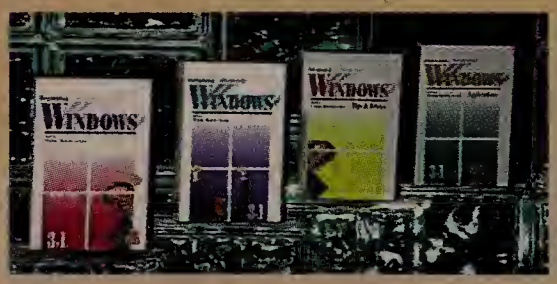

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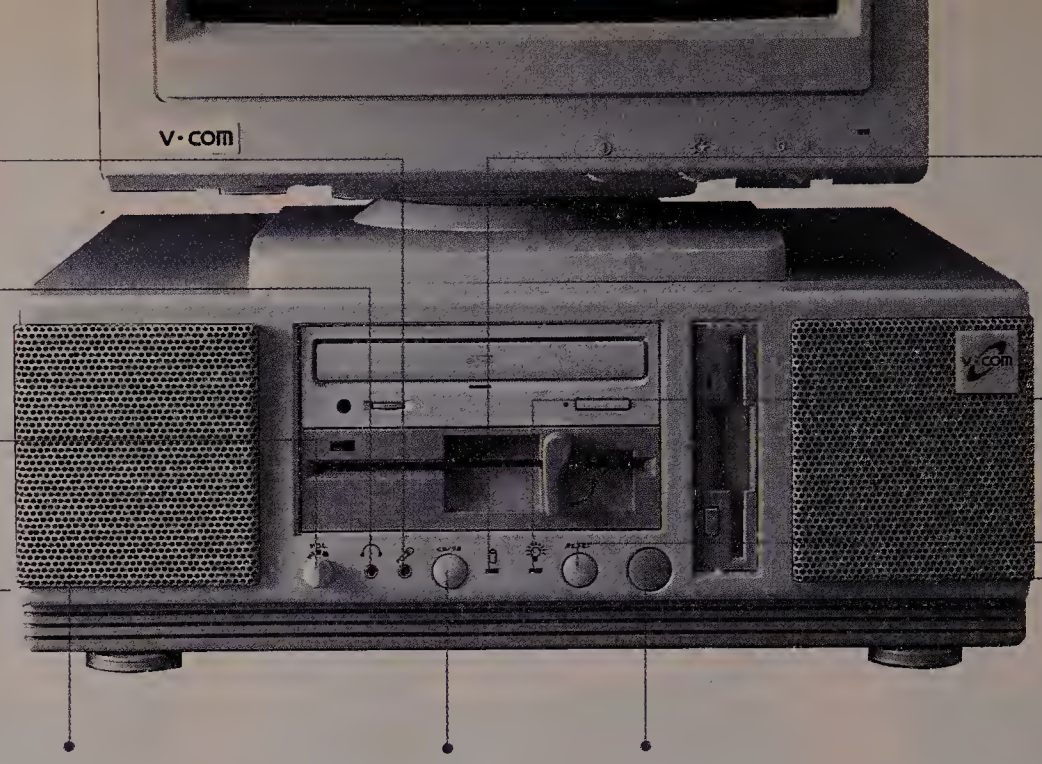

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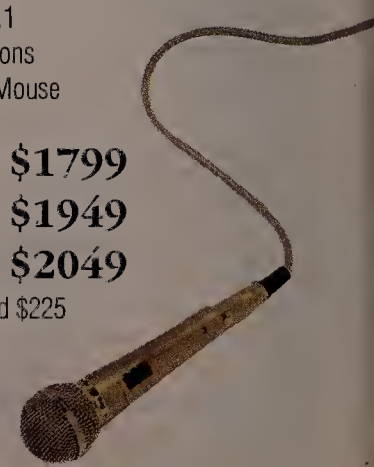

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ates just like a standard disk drive, and its SCSI-2 interface board can be installed alongside existing HD controller boards.

Another well-designed software tool lets you lock the disk into the Sony SMO-P301 drive (so it can't be ejected manually while in use), and you can have Cachét erase the 128MB disk and simultaneously map out bad sectors.

A half-height drive plugs into your PC for $2095, or you can pick up an external model for $2195. Both come with an Adaptec AHA-1510 interface board, all cables, and easy instructions. The M-311 disks list for $75. I could put two of these units to use immediately.

WinFax Pro 3.0

My first reaction to Delrina Technology's *WinFax Pro 3.0* was not favorable. "Uh-oh," I thought, "here's a market-leading product that has been hit by featuritis." But now that I've had some time to get better acquainted wtih Version 3.0, I have a different message for the thousands of *WinFax* users; Don't jump to hasty conclusions. This $129 fax package is a powerhouse with many enhancements. They just take some getting used to.

As an example, the database files of fax recipients now contain 14 fields, a largesse that quadrupled the size of one of my fax phone lists. Version 3.0 automatically indexed that file five ways, producing seven files—and taxing storage capacity and file management. The files are XBase-compatible, in common DBF and NDX formats, but using an XBase manager to edit them separately is hazardous. Delrina's documentation does not cover proper index linkages, and a wrong guess will leave you with mismatched index files.

If you use a telephone credit card, you will probably need to tinker at length to set up the proper prefix and suffix dial strings. With Delrina's help, I set up dial strings for AT&T and MCI Vision cards, a feat I've not been able to accomplish with other fax software. (Users of Intel's SatisFaxtion modems, which use the CAS transmission standard, will find that their modem's setup program controls a number of *WinFax* dialing parameters).

Some users will appreciate the superbly comical set of customizable fax cover sheets, by cartoonist John Caldwell, that come with *WinFax 3.0*. But I don't *want* to bring a grin to the face of a client whose payment is overdue.

Such personal gripes, however, do not diminish *WinFax Pro*'s functionality—from inside any *Windows* print application, you can fax near-laser-quality output to any fax device. This software does far more than simply send a printer file to a COM port; it is a full fax management system. It even transforms incoming fax image files into usable text.

The first *WinFax* was my first fax-modem software, and after trying out a lot of competitive products, I find the new version is still the standard by which all other fax software must be measured.

My friend Jack can put *WinFax Pro 3.0* right to work from a minimal installation on a fax-modem-equipped notebook, leaving Caldwell's cartoons to entertain his stay-at-home staffers.

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Typecase II

A chart entry in *PC World*'s January buyers' guide "The Complete Guide to Scalable Fonts" piqued my curiosity. SWFTE's *Typecase II* TrueType font pack lists an average cost per outline of 50 cents—a mouse, keeping company with a herd of elephants. Which, of course, raises the question, Can this mouse hold its own?

Typecase II contains 44 named font families. A few, like Cargo (imitating stencils on shipping containers), come in a single type weight. Others have multiple fonts; Garamand Classic, a knockoff of the popular PostScript Garamond, features six, from light to bold italic. Some, like Certificate (what you see on certificates in doctors' offices) are display faces with limited use. Others, like Empire Script (a BrushScript look-alike), are common.

So how do *Typecase* fonts print? Surprisingly well. I installed the full package, and—using *Windows* Write—ran amok among my new fonts, printing "The quick brown fox..." in varying point sizes on a 600-dpi printer. Then, in *Word for Windows 2.0*, using *WinFax Pro 2.0*, I sent the equivalent to a fax machine. In both cases, output was clean and sharp. *Typecase II* (and its predecessor, *Typecase I*) are true Foulks Favorite bargains.

Quick Fixtures

Maximizer for Windows (Richmond Technologies & Software) is a sales-oriented personal information manager with well-implemented features. You can categorize address list entries and deal with categories as groups. *Maximizer for Windows* also includes expense account tracking. This $249 Canadian product is a definite challenger to higher-priced PIMs.

TWAIN isn't a product. It's an interface standard for scanners, and it is rapidly gaining industrywide acceptance. Confirming its arrival as a standard, three TWAIN-compliant products—Micrografx's *PhotoMagic*, Logitech's *FotoTouch 2.1*, and Delrina's *WinFax Pro 3.0*—surfaced in my in-basket this month. With TWAIN, I was able to scan an image of a canceled check directly into a *Windows* word processor document. It also permitted me to hook up color and black-and-white scanners to the same PC with no conflict in use. As *PC World* went to press, more than 75 companies were pledged to TWAIN support. Be sure to look for this new standard in the software and scanner you buy.

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- **WinFax Pro 3.0** Delrina Technology, Inc.; 800/268-6082
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Thom Foulks is a contributing editor for PC World. *He can be reached on PC World Online (see page 8 for more information).*

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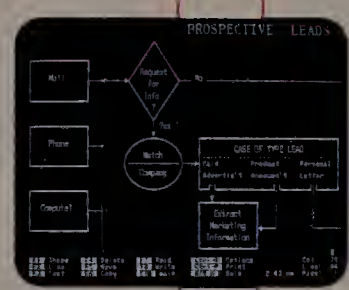

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Creation and Other Recreations

If you have tendencies toward megalomania, *SimLife*, the latest "software toy" from Maxis, could be hazardous to your mental health. It gives you the power to invent worlds, create plants and animals from the genetic level up, design environments, simulate and control evolution, and even tinker with the basic physical nature of the universe.

You start out by naming your world—a treat in itself. Then you use your mouse and a series of simple menus to build terrain with lakes, mountains, and other geological features and place them where you want. Finally, you pick weather and other variables. Rainfall? Soil quality? Food sources? You decide.

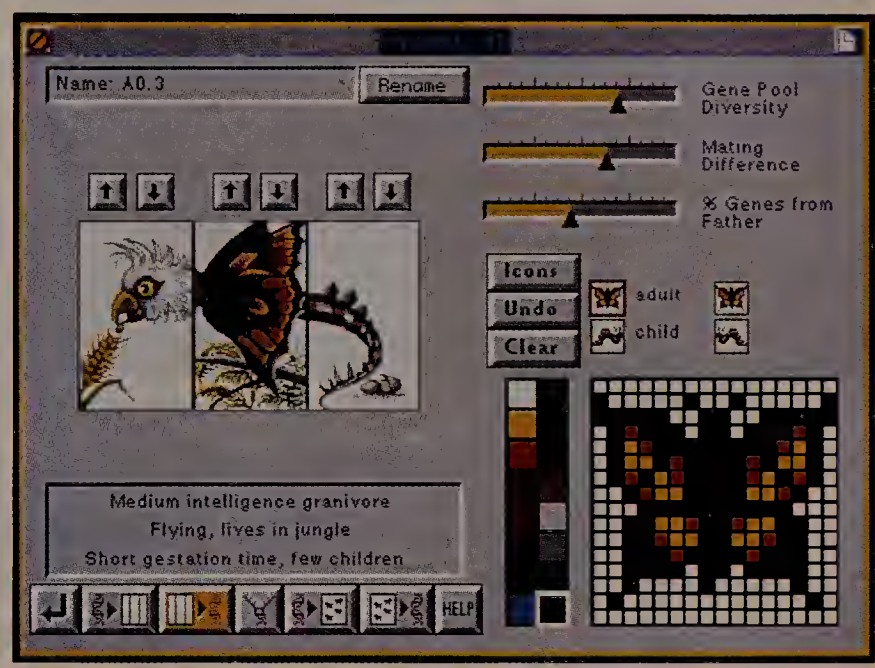
You exercise the same detailed control over the plant and animal species. Start with fauna and flora or make up new ones. Ever wonder whether flying horses would be viable? Create some, and find out. You can adjust every variable imaginable—how much an animal eats, how often it mates, even what its on-screen icon looks like.

Once your world is set up, you start the clock—letting the animals and plants interact over a period of days, years, even eons. If you get bored you can poke around at a "running" ecosystem to see what happens: Introduce a flood, a famine, or a huge comet, or simply extend your godly finger and smite individuals of your choice.

How do you win? Well, since *SimLife* isn't really a game, the concept of winning is a bit vague. In one sense, you win if you have a good time. But I think a better way is to build a world in which your creations live long and prosper.

And make no mistake; that's not easy. Your first few tries at building a world may lead you to rename this toy "SimDeath," as you watch all your lifeforms perish from lack of food, too much rainfall, or insufficient offspring.

A superb on-screen tutorial (and an excellent manual) will help you get the hang of the controls. But the basic concepts require some work to master. It may even take you longer than seven days.



Designing a better butterfly is easy in SimLife's lab: Just set the sliders, choose a few icons, and let it flutter off into the world.

Combat Simulation for Business Warriors

The chessboard is the ultimate battlefield. Beneath its odd-looking pieces and stylized moves, it's really savage combat, ideal for business warriors who want to hone their strategic powers and focus their aggression. Of course, it's also a swell way to blow off steam.

There are scads of chess-for-PC games around, but *Battle Chess Enhanced CD ROM*—a version that makes no bones about the game's frankly bloodthirsty character—is unique. If you have a multimedia PC (that is, a CD ROM player, a sound board, and *Windows 3.1*), chess will come alive in a series of highly realistic battles: Knights behead bishops, bishops levitate pawns and spin them in the air until they break apart. All the fighting is accompanied by martial music plus the clanks, grunts, and screams of medieval warfare. The animation is stupendously detailed, and the characters are lots of fun—including the sultry queens who swish around the board like Mae West.

At the heart of *Battle Chess* is the chess engine itself, and whatever algorithm it uses had no trouble beating me or my far more skillful friends. Yet *Battle Chess* seems aimed primarily at youngsters and beginners, not experienced players. The animated battles slow the game to a tedious crawl, and after you've seen all the combat variations (of which there are quite a few), having to view them over and over is painfully boring. Moreover, the music stops for every capture, while the CD struggles to load a new batch of music and animation—slowing the action even further.

Nonetheless, chess neophytes will be captivated by the battles and the clever animated tutorials in which each piece explains how it is best used. A DOS version is included; it's nearly as good, only the graphics aren't quite as slick.

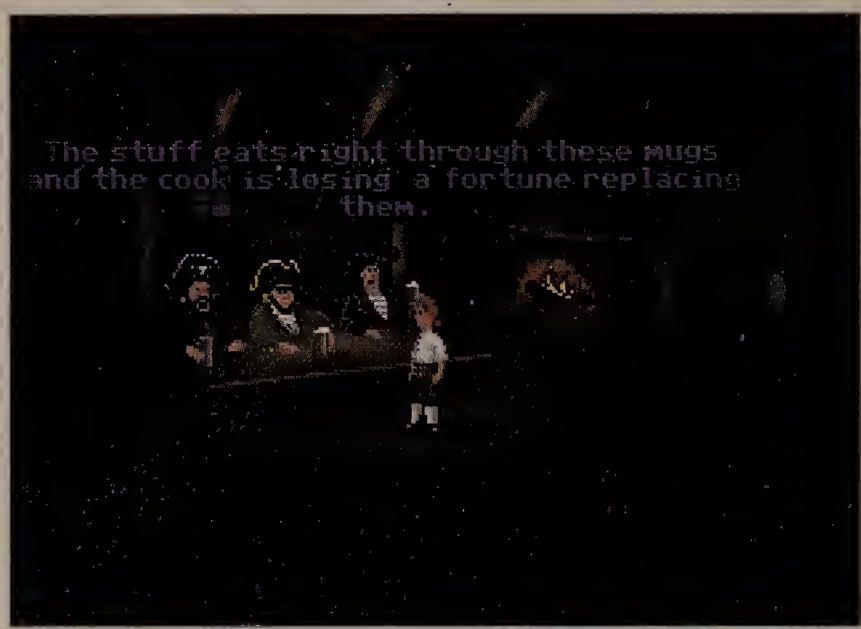
Sea Dogs and Piranha Poodles

You make your way into town, you spot a pack of scruffy sea dogs loitering on the corner, you stroll up to them and ask, "Say, are you pirates?"

They look right. They look left. No cops in sight. "Of course we're pirates," the nastiest one replies. "You can't buy clothes like these off the rack!"

Welcome to *The Secret of Monkey Island*, a charming Caribbean role-playing adventure from LucasFilm Games, newly upgraded for CD ROM and distributed by Software Toolworks. Among the new features are an improved point-and-click interface (no typing required), additional dialogue by

By Michael Goodwin



THESE BIG-TIME PIRATES in The Secret of Monkey Island kindly fill you in on esoterica. The subject under discussion is grog.

science fiction novelist Orson Scott Card (who also worked on *Loom*, from the same companies), and an exceptional music track that's heavy on sea chanteys and reggae.

As with most LucasFilm games, the story line and delightful dialogue are the strong suits. You start the game on Melee Island, somewhere in the Caribbean. You are Guybrush Threepwood, a young man whose biggest problem is his name—people are always making jokes about it. Your burning desire is to become a pirate, and to achieve this socially ambiguous goal you'll need to find some pirates, steal a sword, learn to use it, and pass three little piracy tests. But that just gets you in the door. Once you've qualified, your adventures begin. The "secret" of the title is no laughing matter.

A good gaming interface should "disappear," leaving you to enjoy the adventure, and this one is very good. Once you get the hang of using letter keys (*O* for "open," *T* for "talk," and so on) along with mouse clicks for pointing, you'll find yourself speeding along. And though the drawing and animation are a bit crude, the story unfolds with smooth, cinematic pacing.

Best of all, writer/director Ron Gilbert has infused *Monkey Island* with a delicious sense of fun. When you get to town, you'll find almost everyone in the place ready and willing to sell you a "genuine" pirate treasure map. And when you try to break into the governor's mansion, you'll discover that it's guarded not by pit bulls but by deadly Piranha Poodles. There's even an "advertising pirate" lurking in the darkest corner of the saloon, ready to hit you with . . . no, not a blackjack, a sales pitch for *Loom*.

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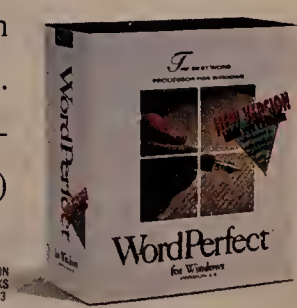

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A mouse-based interface helps you navigate, but there are so many elements to control that even the most experienced games strategist will find *Great Naval Battles* a challenge. I wouldn't be surprised if naval warfare students at our service academies were training on similar software.

Unfortunately, the early version I tested had some problems. Not only wouldn't it use my sound board, but one of the "fatal errors" trashed the CMOS set-up data for my hard disk! SSI promises a fix by the time you read this—but you might want to call and make sure this bug has been swatted before you load the game.

- **SimLife** $69.95; Maxis; 800/336-2947
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- **Battle Chess Enhanced CD ROM** $79.95; Interplay Productions; 714/553-6678
  Reader service no. 793
- **The Secret of Monkey Island, CD ROM Edition** $79.95; LucasArts/LucasFilm Games/Software Toolworks, Inc.; 415/883-3000
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- **Great Naval Battles: North Atlantic 1939-1943** $69.95; Strategic Simulations, Inc.; 408/737-6800
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Tools for Keeping Files Straight

You know the routine: At 5 p.m., you copy some work to a floppy and bring it home ("Yeah, that's the file name"). Take it back to work in the morning and copy it again ("Did I get the right one?"). Make another copy for a business trip, then copy the changes you made on the road to your office and home machines ("Now did I copy it from the office to the notebook to the home or from the home to the office to the . . . ?"). It's simple—and utter chaos.

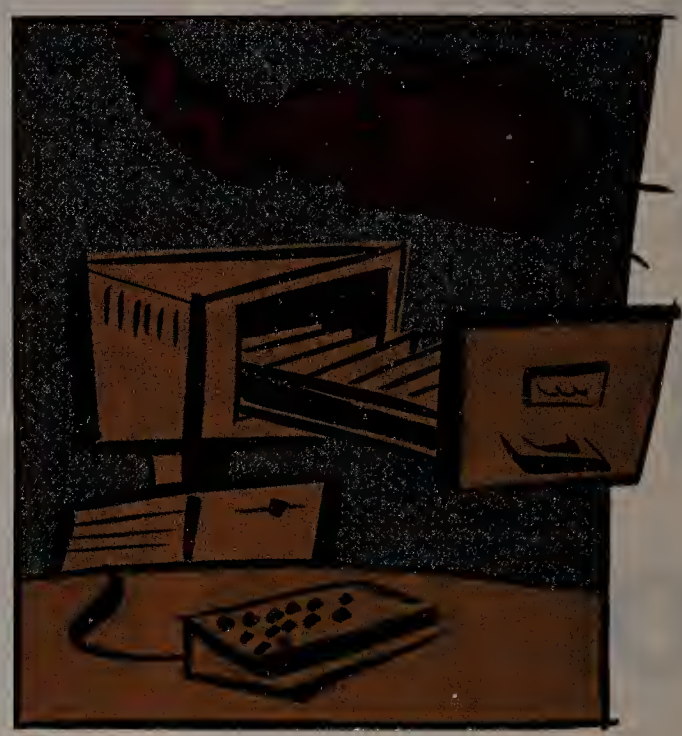
I've been there. I've wasted a lot of time—that ever-shrinking commodity—futzing with which file is where. And in the process, I undoubtedly wrote over some newer files with older versions. Luckily, I've found a few products that copy and track files for me, giving me more time to be productive—or have fun.

Home and Back Again

The best program I've found for tracking files across multiple computers is MBS Technologies' *FileRunner*. If I've got copies of this column on my home computer, my office computer, and my notebook (not an unusual situation), my *FileRunner* floppy knows when each of them was last copied to the other and which copies have been updated since then. I let the program worry about what's what because computers love that kind of work.

You install *FileRunner* on all your computers, tell it which files need to be transferred (by file name and directory, using wild cards), and start carrying around the floppy. You can stop worrying about writing over different versions of a file; *FileRunner* will alert you if the same file has been changed on more than one computer since the last transfer. You can get 400 files on a floppy (I should only *be* so prolific), compressing them if need be. The one deficiency? I would like more file viewers; right now, there's only ASCII. • *FileRunner 1.4 $99.95; MBS Technologies, Inc.; 800/860-8700, 412/941-9076, 412/941-7076 (fax). Reader service no. 661*

But there are times when I need to copy *a lot* of files from one computer to another. Instead of messing with floppies, my essential tool I use is Traveling Software's *LapLink Pro*, which links the two computers by cable. The software is easy to use—you get a split screen with each computer's files listed side by side. You can perform the usual copy and move commands, use a single command to copy the entire drive, or have *LapLink* synchronize newer files across two machines. *LapLink* really came in handy when I bought a new computer and transferred every last byte from the old clunker before giving it to my brother-in-law. (If you're copying programs to another computer, make sure you abide by each program's licensing agreement.) The program discounts for about $150 and comes with two cables, one for parallel and one for serial connections. My only wish is a choice of cables and a lower price. • *LapLink Pro $169.95; Traveling Software, Inc.; 800/343-8080, 206/483-8088, 206/485-6786 (fax). Reader service no. 662*



Cable Ready

But what if all your ports are being used? Instead of crawling under the desk to swap cables, try Xircom's Parallel Port Multiplexer, a handy gadget that enables you to plug two devices into one parallel port, discounts for $80, and is supported by *LapLink Pro*. Still not enough ports? For about $230, Star Gate Technologies' One Slot will give you the PC's standard maximum of four serial and three parallel ports. • *Parallel Port Multiplexer $99; Xircom; 800/874-7875, 818/878-7600, 818/878-7630 (fax). Reader service no. 663* • *One Slot $349; Star Gate Technologies; 800/782-7428, 216/349-1860, 216/349-2056 (fax). Reader service no. 664*

Okay, so you don't want to mess with cables, or even carry floppies. There's another way to share files: Get a remote communications program to access your office system's hard disk directly. I use Triton Technologies' *CO/Session* because even though I'm mostly a DOS kind of guy, we're both compatible with *Windows*. In fact, if you leave your office machine in DOS, *CO/Session* will let you load *Windows* on it from home. What's really cool is, your home machine doesn't have to have *Windows* or support it—the setup will even work on my brother-in-law's sluggish 286. • *CO/Session 6.1 $179; Triton Technologies; 800/322-9440, 908/855-9440, 908/855-9608 (fax). Reader service no. 665*

Now I don't have to waste time keeping track of my files. This leaves me free for more positive pursuits, like helping my brother-in-law speed up his computer.

Contributing Editor Steve Bass is the president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 8 for more information).

By Steve Bass

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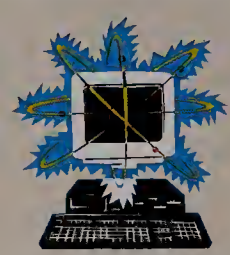

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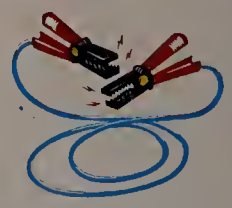

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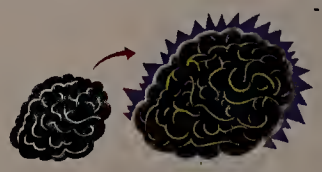

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